# Arithmetick
# MADE EASIER

Than any hitherto Extant;
For the farther Improvement and Intereſt of

# TRADES-MEN.

Wherein is Exhibited,

That very Uſeful SCIENCE, in a new and more familiar Manner, in all its Branches, both VULGAR and DECIMAL. With the ready way of computing divers Sorts of Goods ſold by Retale.

ALSO,

A practical Specimen of Menſuration of PLAINS and SOLIDS.

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By D. AYRES SCHOOL-MASTER.

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The Second Edition, Corrected and Revis'd to which is added, A ſhort Treatiſe of Book-keeping, by *W. F.*

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## To the Honourable

## Sir *John Shadwell*, Kt

## Phyſician in Ordinary to His

## *MAJESTY*.

*SIR*,

*YOur great Concern to grace your witty Offsprings with the elegant and refin'd Accompliſhments, the Honour I had of teaching ſome Years, and your ardent Love for Arts and Sciences have induc'd me to Shelter this little Offering under your Honour's Protection,* [illegible] *preſume, will not only ſerve as their Monitor in my Abſence but lead to ſuch other Parts of Arithmetick, as they may incline to Study:*

*But a further Reaſon of this Dedication is to acknowledge the Favours confer'd on*

*Your HONOURS*

*moſt obliged, and*

*devoted humble Servant,*

**Daniel Ayres.**

# THE PREFACE

*TIS not here intended to detain the Reader with Etymology of Words, not to enter into a curious Diſquiſition after the firſt Founders or Inventors of this excellent Science. It matters not much who firſt deviſ'd it, whether they were the* Egyptians, Phenicians, *or* Arabians *Its immenſe Value and univerſal Service has ever recommended it to the World, ſo that tho' we are always wanting its Aid in real Buſineſs yet it will never ſtand in need of our* Encomiums *Out of Gratitude, Nations and States muſt unitedly confeſs its ſurprizing Effects, Powers and Operations, and every one indeed that contemplates it, muſt acknoledge it one of the moſt worthy and beneficial Arts that was ever diſcovered.*

*And tho'* Arithmetick *may lie under the wrong imputation of being auſtere and abſtruſe, yet when her doctrines are well handled, and ſet in a true Light, She will appear perhaps altogether as affable, pleaſant, and engaging as any of the liberal Arts.*

*But one reaſon ſhe bears a ſhy and reſerv'd Aſpect to any is, becauſe ſhe is ſo much neglected, and ſo little practis'd by them, which is too often the Treatment ſhe meets with from the Fair, with whom one wou'd have thought, ſhe might have promis'd a much larger and more intimate Acquaintance, eſpecially conſidering they have ſo much Time, and ſo many Opportunities of Books and Maſters, and that a competent Skill in Arithmetick is, as it were the Unum Neceſſarium or one of the moſt requiſite and preferable Accompliſhments.*

*'Tis for want of her ſeaſonable Interpoſition and Directions, that ſome Perſons ſcarce know what they do in Buſineſs, and give ſuch a confus'd Account of it, while others, who have courted this obliging Art, and contracted with her an uſeful Friendſhip, have learnt to keep every thing exact and right, and perhaps are enabled to countermand their Fate by preventing invetable Loſſes that wou'd otherwiſe enſue One might name indeed a great many gallant and faſhionable Exerciſes, that are thought by ſome to be more amuſing and indulgent to airy Tempers, which may ſerve, as they phraſe it, to paſs away the Time, but can ſeldom furniſh one Grain, of that rational and ſubſtantial Good, ariſing from the Knowledge of this Science.*

*Wherefore, the whole Scope and Deſign of this Treatiſe is to explicate and reveal the Myſteries of it's Numbers in a new and familiar manner obvious to any Capacity. The treading as it were in the Steps of my Relations, the late Colonel* AYRES, *will at leaſt be no diſadvantage to this Undertaking. 'Tis generally allowed he was the moſt celebrated Maſter of his Time, then by his rare Invention contributed more than any to the Progreſs of fine Writing, and Arithmetick. Twas to his indefatigable Endeavours that we owe the firſt conſiderable Improvements in the Engraving of Writing by enabling the Graver to come ſo near to the Nature and Freedom of the Pen, and 'twas his wonderful Eſſays that were the Source and Fountains from whence the modern Artiſt's have ſince deriv'd and produc'd ſo may elegant and beautiful Performances in Penman-ſhip, and graving and painting it.*

*The Diſcouraging Objection againſt Works of this Nature, that they are too tedious and Intricate, will be very much taken off here, becauſe the Whole is ſo ſhort, as well as facil and perſpicuous, and there are ſeveral ſuitable, and profitable Abreveations.*

*The Baſis of this Art is plainly demonſtrated Verbatim, as well as other Parts, becauſe if the*

*As to* Vulgar *and* Decimal *Fractions, tis hoped, that even their craggy Paths are levelled and what this Compoſure offers in that Province will at leaſt not to be found unacceptable.*

*The* Menſuaration *of* Superficies *and* Solids *which is of ſuch extenſive Uſe and Profit. Likewiſe to this Edition is added a ſhort Treatiſe of Book-keeping by way of* Debtor *and* Creditor, *now experienced to be the moſt accurate Method* (if rightly underſtood) *to inform all Tradeſmen and Others. How to State their Accounts and what Profit or Loſs accrues, by the Commodities they deal in: Being very conciſe and eaſe to be attain'd.*

*I am in great hopes that vaſt Benefit will accrue to others from the ſubſequent Tractate, eſpecially to thoſe who have been ill-grounded by illiterate Pretenders, and have never been ſo happy as to have the Aſſiſtance of an able Maſter As for ſuch as have formerly learnt a great deal and it may be mightily forgot, this as a friendly Monitor, will be of the utmoſt Utility to them, if they frequently conſult it. In ſhort, tis preſumed here is ſomething for the Taſte and Intereſt of every one who knows either the Want, or Worth of any of the Branches of this great Pillar of Trades, Offices, and Employments*

*Arithme-*

# ARITHMETICK.

## CHAP. I.

ARITHMETICK is the Science of Computaion, or the Art of Numbering, or Reckoning by Figures, in a right and moſt compendious manner, whoſe whole Superſtructure is founded on the firſt Five Rules.

## NUMERATION.

IS that part of Arithmetick by which we are ſhewn how to read or write down any Number propoſed; to which End we are to note, that all Numbers are compoſed of theſe Nine Digits, *viz.* 1, 2, 3, 4, 5, 6, 7, 8 9, and 0 Cypher; which of it ſelf ſignifies nothing, but ſerves, to Increaſe or decreaſe Numbers according to its Place of ſtanding: So that every one of the Nine Digits have their Value accounted according to the Places of ſtanding; and have two Values, *viz.* one Certain and the other and the other Accidental: The certain is, when any of them ſtand alone, or by themſelves, as 6 ſix, 5 five, and 9 nine, *&c.* The Accidental Value is according to the Place it ſtands in; ſo that 8 may be Eight, Eighty, Eight Hundred, or Eight Thouſand, *&c.* For it ſtands alone by it ſelf, it is but Eight, but it ſtands in the Second Place, towards the Left-hand, it is Eeight Tens, or Eighty; if in the Third Place Eight Hundreds; and if in the fourth place, Eight Thouſands, *&c.* and ſo of any of the reſt of the Figures: *But* the order of Places, and Value of the Figures accordingly, is beſt diſcover'd by the Table following.

| | *Hundreds of Millions* | *Tens of Millions* | *Millions* | *Hundr. of Thouſands* | *Tens of Thouſands* | *Thouſands* | *Hundreds* | *Tens* | *Units* | *Mil.* | *Thouſ.* | *Unit* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | | | |
| Numbers. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 123, | 456, | 789 |
| 144 | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 12 | 345, | 678 |
| 27000 | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 234, | 567 |
| 30762 | | | | 1 | 2 | 3 | 4 | 5 | 6 | | 123, | 456 |
| 570620 | | | | | 1 | 2 | 3 | 4 | 5 | | 12, | 345 |
| 4200067 | | | | | | 1 | 2 | 3 | 4 | | 1, | 234 |
| 72406070 | | | | | | | 1 | 2 | 3 | | | 123 |
| 572007047 | | | | | | | | 1 | 2 | | | 12 |
| | | | | | | | | | 1 | | | 1 |

By this Table we may obſerve that every Figure from the Right Hand to the Left hand Increaſes by a tenfold proportion; ſo that by getting by Heart, the Words at the Head of the Table, and the Number of Places as Units, Tens, Hundreds Thouſands, Tens of Thouſands &c. we are enabled to read and Write down Numbers accordingly; but for the eaſier reading the ſaid Table, I have ſet down the Numbers by Periods on the right Hand of it, and over them Units, Thouſands and Millions and alſo the other Numbers on the left, are ſet for the Exerciſe of the Learners Ability.

The firſt Line of the Table to be read thus; One Hundred Twenty Three Millions, Four Hundred fifty ſix Thouſand, Seven Hundred Eighty Nine, &c. And the laſt Number on the Left to be read thus, Five Hundred Seventy Two Millions Seven Thouſand and Forty Seven &c.

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# CHAP II.

## Of *ADDITION.*

ADDITION is an Arthmetical gathering of ſeveral Numbers in one Total or whole Sum.

Addition is of one Denomination, or of ſeveral of one Denomination, when the Numbers are all of one Kind or Sort, Yards Gallons, Pounds, Ells, Acres, &c. And are to be ſet in ſuch order, in direct Lines, from the higheſt to the loweſt; that Units may ſtand under Units, Tens under Tens and Hundreds under Hundreds, &c. As,

Thus:

| *X of Thouſands* | *Thouſands* | *Hundreds* | *Tens* | *Units* |
|---|---|---|---|---|
| 7 | 4 | 5 | 9 | 7 |
| | 4 | 6 | 5 | 0 |
| | 3 | 7 | 4 | 2 |
| | | 8 | 7 | 6 |
| | | | 4 | 2 |
| | | | | 9 |

| | | | | | |
|---|---|---|---|---|---|
| 7 | 4 | 5 | 6 | 7 | |
| | 4 | 6 | 5 | 0 | |
| | 3 | 7 | 4 | 2 | |
| | | 8 | 7 | 6 | |
| | | 4 | 2 | | } wrong |
| | | | 9 | | |

So that 9 muſt not ſtand under the 4 for then it would be caſt up as 9 Tens, whereas it is but 9 Units, or Ones, nor the 42 under 87 for then the 4 ~~would be caſt up as 4 Hundreds, when it is but~~ 4 Tens, and the 2 Units as 2 Tens becauſe wrong plac'd as on the right hand may be obſerv'd —— *Note*, it is not material whether the greater or leaſt Number be uppermoſt, provided they ſtand in their due Rank, ſo that 9 might have been firſt, and 74567 the laſt Number, and yet the Total the ſame —— In caſting up Numbers of one Denomination, we muſt always (after a Line drawn underneath) remember to begin to reckon at the Right-Hand, and for every Ten in each Row, to carry one to the next Row, having firſt ſet down under the Line what is over Ten, or Tens, as ſuppoſe the firſt Row amounts to 26 I ſet down 6 under the Line in its proper place. and carry 2 from the 2 Tens, to the next Row; and when any of the Rows come to juſt even Ten or Tens and nothing over as 20, 30, 40, *&c.* then I ſet down 0, and carry ſo many Ones as there were Tens in the Rank to the next Rank or Row, and what ever the laſt Rank amounts to, ſet it down.

In this Example begin at the Bottom towards the Right-Hand as before directed; ſaying 4 and 1 is 5, and 4 is 9, and 7 is 16, and 6 is 22, and 4 is 26, and 9 is 35 wherefore I ſet down 5 in its proper place, that is, juſt under the Row I have caſt up, and carry 3 for the 3 Tens contain'd in it, to the next Rank, ſaying 3 that I carry and 6 is 9, and 7 is 16, and 2 is 18, and 2 is 20, and 7 is 27, and 6 is 33, ſo that I ſet down 3 and carry 3 for the 3 Tens to the next, ſaying, 3 that I carry and 5 is 8, and 4 is 12, and 7 is 19, and 2 is 21, and 4 is, 25, I ſet down 5, and carry 2 for the Two Tens to the next Row ſaying 2 that I carry and 5 is 7 and 4 is 11, and 7 is 18, which being the laſt Row I ſet down 18, (otherwiſe I muſt have ſet down 8 and carried 1) ſo the work is done and the Total Number of Gallons is 18535 as in the Margin.

| *Gall.* |
|---:|
| 7469 |
| 274 |
| 6 |
| 27 |
| 4724 |
| 564 |
| 5471 |
| 18535 |

Thus are done all Sums in Addition of one Denomination; as may be ſeen in the following Examples ſet on purpoſe for the Learners Practice.

| *Pounds* | *Gallons* | *Ells* | *Acres* | *Yards* | *Pounds* |
|---:|---:|---:|---:|---:|---:|
| 47 | 69 | 472 | 42 | 4762 | 57246 |
| 74 | 96 | 600 | 24 | 3267 | 749 |
| 42 | 37 | 47 | 67 | 7246 | 24271 |
| 67 | 73 | 10 | 76 | 4007 | 472 |
| 76 | 62 | 9 | 9 | 3742 | 2372 |
| 60 | 47 | 426 | 41 | 7269 | 72430 |
| 366 | 384 | 1564 | 259 | 30292 | 157540 |

But that nothing be wanting to make every thing plain and Intelligible I have ſubjoyn'd the familiar Examples following *viz.*

*Example* 1. Suppoſe a Perſon owes to ſeveral others as follows, *viz.* to A 24 pounds to B 17 pounds to C 20 pounds to D 14 Pounds to E 6 pounds, F 13 pounds and G 12 pounds. How many Pounds doth he owe in all. *Anſwer.* 106 *l.* as may be ſeen in the Margin.

| | *l.* |
|---|---|
| A | 24 |
| B | 17 |
| C | 20 |
| D | 14 |
| E | 6 |
| F | 13 |
| G | 12 |
| | 106 |

*Ex* 2. Again, Admit that in the late War with *FRANCE* the Queen had in *Flanders*, 30719 Men, in *Germany* 12400, in *Spain* 15760, in *Portugal* 4769, in the Navy 44760, and at Home 17600, how many Men in all were in Her Majeſty's Service? *Anſwer*, 116028, as in the following Sum.

| | |
|---|---|
| *Flanders*, ———— | 30719 |
| *Germany*, ———— | 12400 |
| *Spain*, ———— | 15760 |
| *Portugal*, ———— | 4769 |
| *Navy*, ———— | 34760 |
| *Home*, ———— | 17620 |
| Total | 116028 |

*Ex.* 3. Guag'd ſeveral Casks of Wine containing *viz.* one qt. 146 Gallons, another qt. 204, another 79 a fourth, qt. 256, a fifth qt 94, the ſixth qt. 114 Gallons, How many Gallons were there in all? *Anſwer* 893, as in the Example.

| | Gallons |
|---|---|
| | 145 |
| | 204 |
| | 79 |
| | 256 |
| | 94 |
| | 114 |
| In all, | 893 |

Ex. 4. Meaſur'd 6 Pieces of Cloth, containing *viz.* N° 1 qt. 46 Yards; 2, 70 Yards; and N°. 6, 45 Yards; 5, 15 Yards; and N°. 6, 45, Yards: How many Yards in all? *Anſw.* 270 Yards, as in the Margin.

| N° | Yds. |
|---|---|
| 1 | 46 |
| 2 | 70 |
| 3 | 56 |
| 4 | 41 |
| 5 | 12 |
| 6 | 45 |
| Total | 270 |

### *To Prove Addition.*

The beſt and practicable way, is to begin at the Top on the Right-Hand caſt it downwards, as before Upwards and if it prove the ſame, the Work is right, otherwiſe not, wherefore they muſt be caſt upwards and downwards till they do agree.

Addition of ſeveral Denominations is, when the ſeveral Lines conſiſt of divers Names; as of Pounds Shillings, Pence Farthings, *&c.* or of Tuns, Hundreds, Quarters, Pounds Weight *&c.* Yards, Quarters, Nails.

## *Of Money.*

The Current Coins of this Nation is made of Copper, Silver, or Gold, of Copper is made Farthings and Half Pence, of Silver is made Pence, Two-Pences, Three-Pences, Groats, Six-Pences, Shillings, half Crowns and Crowns, of Gold is made half Guineas, Guineas, Jacobuſſes, Caroluſſes, Five Guinea Pieces, and ſome other antient Pieces But beſides theſe we appropriate other Names, to Money, of which we have no particular Coin, as Nobles, Angles and Marks, the Noble is 6 *s.* 8 *d.* the Angel 10 Shillings, and the Mark 13 *s.* 4 *d.* Notwithſtanding theſe ſeveral Denominations of Money, we keep our Accounts in Pounds, Shillings Pence and Farthings, only, A Table of which follows *viz.*

| | |
|---|---|
| In a Pound Sterling are | 960 Farthings<br>250 Pence,<br>60 Groats, |

| | | | | | Marks |
|---|---|---|---|---|---|
| 4 | Farthings | make | 1 | Penny | *d.* |
| 12 | Pence | make | 1 | Shilling | *s*, |
| 20 | Shillings | make | 1 | Pound | *l.* |

The Marks are taken from the Lattin names L. *Libræ*, s. *Solidi*, *d. Denarii*, and *Farthings*, or *qr. Quadrantes*; but Farthings, or the Fractions of a Penny are generally, and beſt, ſet thus, $\frac{1}{4}$ a Farthing $\frac{1}{2}$, a Half-penny, $\frac{3}{4}$ Three Farthings, that is a quarter of a Penny, Half a Penny, and Three-quarters of a Penny.

## *Addition of* MONEY.

Before we proceed to Examples in this Rule it is neceſſary that the following Tables be learnt by Heart, *viz*.

| d | s | d | Pence | Shil. | Shil. | l. | s. |
|---|---|---|---|---|---|---|---|
| 20 is | 1 | 8 | 24 s | 2 | 30 | 1 | 10 |
| 30 | 2 | 6 | 36 | 3 | 40 | 2 | 00 |
| 40 | 3 | 4 | 48 | 4 | 50 | 2 | 10 |
| 50 | 4 | 2 | 60 | 5 | 60 | 3 | 00 |
| 60 | 5 | 0 | 72 | 6 | 70 | 3 | 10 |
| 70 | 5 | 10 | 84 | 7 | 80 | 4 | 00 |
| 80 | 6 | 8 | 96 | 8 | 90 | 4 | 10 |
| 90 | 7 | 6 | 108 | 9 | 100 | 5 | 00 |
| 100 | 8 | 4 | 120 | 10 | 110 | 5 | 00 |
| 110 | 9 | 2 | 132 | 11 | 120 | 6 | 10 |
| 120 | 10 | 0 | 144 | 12 | | | |

*Example* (1*ſt*.)

Admit a Perſon hath owing to him from ſeveral others, ſuppoſe ſix *viz*. One owes him 5*l*. 4s. 6*d*. another 7*l*. 11*s*. 9 *d*. a Third 4 *l*. 7*s*. 5*d*. a Fourth 8*l*. juſt, the Fifth 7 *l*. 8 *s*. 4 *d*. and the Sixth owes him 9 *l*. 7 *s*. 6*d*. how much is owing to him in all from theſe ſeveral Perſons, Anſwer, 41 *l*. 19 *s*. 6 *d*.

| l. | s. | d. |
|---|---|---|
| 5 | 04 | 6 |
| 7 | 11 | 9 |
| 4 | 0[illegible] | [illegible] |
| 8 | 00 | 0 |
| 7 | 08 | 4 |
| 9 | 07 | 6 |
| 41 | 19 | 6 |

To find which Total, ſet down the ſeveral Sums one under the other as in the Margin, ſo that each Name may ſtand directly under the other of the ſame Name, *viz.* Pounds under Pounds, Shillings under Shillings, and Pence under Pence, as it is in the Example. As to the Marks Tradeſmen vary in the Methods of ſetting them down, ſome ſet the Marks over the ſeveral Denominations, thus,
*l. s. d.*
5 4 6; Others ſet the Mark after each Name, thus 5*l.* 4*s* 6*d.* and ſome again ſet the Mark of Pounds, only before the firſt Line; and take the other Denominations conſequentially thus *l.* 5, 4, 6; ſo that after Pounds follow Shillings, and after Shillings neceſſarily ſucceed Pence. The laſt is very elegant, but I ſhall follow the Firſt Method as moſt Practicable in Teaching. In caſting up this Example, and all others in this Rule, we have recourſe to the Table of Money, that is, how many of the ſmaller Name make one of the next greater, *viz.* for every 4 in the Farthings carry one to the denomination of Pence; for every 12 in the Pence carry one to the Shillings, and for every 20 in the Shillings one to the Pounds. Becauſe 4 Farthings make 1 penny 12 pence 1 ſhilling, and 20 ſhillings 1 pound, Having drawn a Line underneath the ſeveral ſums I begin with the leaſt denomination toward the Right-hand (as in all Additions whether of Money Weight or Meaſure we muſt) (which in this Example is Pence) ſaying 6 and 4 is 10, and 5 is 15, and 9 is 24, and 6 makes 30, now 30 pence as in the Table make 2 Shillings [illegible]nce, I put down the 6 pence that is over the 2 Shillings under its proper Rank to wit under Pence and carry the 2 Shillings to the Row of Shillings; ſaying 2 that I carry & 7 is 9 and 8 is 17, and 7 is 24 and 1 is 25, (leaving the ten in the 11 and take it as I come down from

the top) and 4 is 29, and Ten aforeſaid makes 39 ſhillings, wherſore I ſet down the odd 19 ſhillings under its own Rank, and carry 1 pound to the Pounds ſaying 1 that I carry and 9 is 10, and 7 is 17, and 8 is 25, and 4 is 29, and 7 is 36, and 5 makes 41 *l.* 19*s.* 6*d.* as in the Example —— Whenever it happens that the Number of Farthings in the Row of Farthings make juſt ſo many even and nothing over, do not ſet any thing down but carry thoſe Pence to the Row of Pence, and if it happens, that in the Rank of Pence they make juſt even ſhillings, then ſet down, 0, and carry the ſhillings they make to the ſhillings, and if the Row of ſhillings make juſt even pounds ſet down 00, and carry the pounds to the pounds .————

Admit a Wholeſale Trader looking over his Books and Ballanceing them finds due to him from ſeveral perſons as follows, *viz.* I begin at the Bottom of the Right-Hand, ſaying 1 and 3 is 4, and 2 is 6, and 3 is 9 Farthings which is 2*d* Farthing I ſet down ¼ and carry 2*d*, then 2 that I carry and 7 is 9, and 6 is 15, and 2 is 17, and 6 is 23, and 9 is 32, and 1 is 33, and 1 is 34, and 6 is 40, and 6 is 46 pence, and 10 is 56, and 10 is 66 pence, now 66 pence is 5*s*, and 6 pence, I ſet down 6*d.* and carry 5*s.* to the Shillings, ſaying 5 that I carry and 2 is 7 and 9 is 16 and 1 is 17 and 1 is 18, and 7 is 25, and 9 is 34, & 2 is 36, then I come down with the Tens, ſaying 36 and 10 is 46, 56, 66, 76, 86, 96, 106, 116, and 10 is 126, Shillings, or 6 pounds 6 Shillings, wherefore I ſet down 6*s.* under the Shillings and carry 6 pounds to the pounds taking the firſt Row and ſay 9 that I carry and 6 is 15, and 6 is 21, and 1 is 22, and 5 is 27, and 4 is 31, and 4 is 35, and 7 is 42 and 9 is 51, and 9 is 60, and 7 is 67, I ſet down 7 and carry 6 for the 6 Tens (for the pounds are always caſt up as ſums of one Denomination for every 10 carrying 1 to the next Row; & in all additions whether of Money, Weight or Meaſure &c. their Denominations towards the Left-hand muſt be ſo caſt up, ſaying 6 that I carry and 7 is 13 and 7 is 20 and 4 is 24, and 1 is 25, and 7 is 32 and 4 is 36, and 5 is 41, and 4 is 45 and 1 is 46 and 4 is 50, which is 5 Tens and nothing over, wherefore I ſet down 0, and carry 5, ſaying 5 that I carry and 1 is 6, which I ſet down in the Third and laſt Place. So that the Work is done. and the Total ſum is *607 l.* 09 *s* and *6d* $\frac{1}{4}$ as in the Example may be ſeen——

| | | | |
|---|---|---|---|
| A—— | 47 | 10 | 6 |
| B—— | 19 | 10 | 0 |
| C—— | 49 | 12 | 6$\frac{3}{4}$ |
| D—— | 57 | 19 | 11 |
| E—— | 40 | 00 | 0 |
| F—— | 74 | 10 | 11$\frac{1}{2}$ |
| G—— | 14 | 17 | 9 |
| H—— | 5 | 00 | 0 |
| J—— | 1 | 01 | 6 |
| K—— | 146 | 11 | 2$\frac{1}{4}$ |
| L—— | 70 | 19 | 6 |
| M—— | 79 | 12 | 7$\frac{1}{4}$ |
| | 607 | 06 | 6$\frac{1}{4}$ |

Now follow ſome Examples for the Learners Practice.

| *l.* | *s.* | *d.* | *l.* | *s.* | *d* | *s.* | *d.* | |
|---|---|---|---|---|---|---|---|---|
| 57 | 17 | 10¼ | 39 | 17 | 10¼ | 19 | 14 | 1 |
| 41 | 19 | 11½ | 19 | 12 | 10½ | 57 | 17 | |
| 57 | 14 | 10¾ | 19 | 19 | 11¼ | 47 | 12 | 1 |
| 97 | 16 | 9½ | 19 | 17 | 11¾ | 41 | 19 | 1 |
| 16 | 10 | 11¼ | 19 | 17 | 7¼ | 34 | 17 | 1 |
| 87 | 17 | 10½ | 71 | 10 | 9½ | 98 | 19 | 1 |
| 16 | 18 | 11¼ | 57 | 15 | 1½ | 31 | 17 | 1 |
| 87 | 19 | 10¾ | 72 | 16 | 10¼ | 57 | 15 | |
| 464 | 17 | 1¾ | 321 | 09 | 00¼ | 390 | 16 | 10 |

Uſeful Tables of Parts, for the more ready adding of the Weights and Meaſures uſed in *England* for by knowing the Affinity that one Denominatio bears to another; the Learner may be able to caſ up any ſort of Addition whatſoever.

### *Of Avoir-dupois Weight.*

| | | |
|---|---|---|
| 16 Drams | make | 1 Ounce |
| 16 Ounces | | 1 Pound |
| 28 Pounds | | 1 Quarter of a Hundred |
| 4 Quarters | | 1 Hundred |
| 20 Hundreds each 112 Pound | | 1 Tun. |

By this Weight is weighed all ſorts of Grocery alſo, Druggs, Iron, Braſs, Copper, Lead Tallow, Soap, Fleſh, *&c.*

### *Troy-Weight*

| | | |
|---|---|---|
| 24 Grains, | make | 1 Penny-Weight |
| 20 Penny-Weight, | | 1 Ounce. |
| 12 Ounces | | 1 Pound |

By this Weight is weigh'd Silver, Gold, Jewels, and Electuaries.

### *Apothecaries-Weight.*

| | | |
|---|---|---|
| 20 Grains | make, | 1 Scruple |
| 3 Scruples | | 1 Dram |
| 8 Drams | | 1 Ounce |
| 12 Ounces | | 1 Pound |

### *Cloth-Meaſure*

| | | |
|---|---|---|
| 4 Nails | make, | 1 Quarter |
| 4 Quarters | | 1 Yard |
| 5 Quarters | | 1 Ell *Engliſh* |
| 3 Quarters | | 1 Ell *Flemiſh*, |

### *Avoirdupoize Weight.*

| (10) | (20) | (4) | (28) | (10) | (20) | (4) | (28) |
|---|---|---|---|---|---|---|---|
| *Tuns* | *C.* | *qrs.* | ℔. | *Tuns* | *C.* | *qrs.* | ℔. |
| 14 | 15 | 3 | 12 | 46 | 13 | 1 | 16 |
| 29 | 12 | 1 | 24 | 15 | 13 | 3 | 24 |
| 17 | 14 | 1 | 28 | 40 | 12 | 1 | 07 |
| 19 | 17 | 2 | 04 | 13 | 12 | 3 | 27 |
| 82 | 00 | 1 | 12 | 116 | 13 | 2 | 08 |

*Tuns*

| (10) | (20) | (4) | (28) |
|---|---|---|---|
| *Tuns* | *C.* | *qrs* | ℔. |
| 24 | 15 | 2 | 20 |
| 17 | 17 | 1 | 17 |
| 42 | 19 | 3 | 27 |
| 29 | 14 | 2 | 20 |
| 15 | 07 | 03 | 00 |

| | | | (10) | (4) | (28) | | | |
|---|---|---|---|---|---|---|---|---|
| C. | *qrs.* | ℔. | C. | *qrs.* | ℔. | C. | *qrs.* | ℔. |
| 2 | 1 | 06 | 12 | 1 | 17 | 4 | 1 | 11 |
| 7 | 1 | 14 | 15 | 1 | 19 | 2 | 2 | 17 |
| 4 | 3 | 15 | 24 | 3 | 11 | 4 | 1 | 07 |
| 6 | 0 | 14 | 16 | 1 | 12 | 2 | 2 | 15 |
| 4 | 2 | 14 | 24 | 1 | 06 | 4 | 0 | 21 |
| 25 | 1 | 07 | 93 | 1 | 09 | 18 | 0 | 15 |

| (10) | (16) | (16) | (10) | (16) | (16) | (10) | (16( | (16) |
|---|---|---|---|---|---|---|---|---|
| ℔. | *oz.* | *dr.* | ℔. | *oz.* | *dr.* | ℔ | *oz.* | *dr.* |
| 71 | 14 | 06 | 7 | 07 | 14 | 46 | 11 | 14 |
| 20 | 11 | 14 | 2 | 06 | 07 | 15 | 12 | 13 |
| 10 | 04 | 09 | 4 | 10 | 14 | 41 | 07 | 06 |
| 14 | 06 | 14 | 5 | 06 | 14 | 54 | 13 | 15 |
| 21 | 14 | 06 | 4 | 14 | 06 | 43 | 03 | 14 |
| 139 | 04 | 01 | 24 | 14 | 07 | 202 | 00 | 14 |

### *Troy Weight.*

| lb. | oz. | dwt. | gr. |
|---|---|---|---|
| 7 | 10 | 12 | 20 |
| 8 | 04 | 06 | 13 |
| 9 | 06 | 07 | 06 |
| 7 | 01 | 05 | 21 |
| 32 | 10 | 12 | 12 |

| | (12) | (20) | (24) |
|---|---|---|---|
| lb. | oz | dwt. | gr. |
| 11 | 11 | 15 | 13 |
| 4 | 04 | 14 | 23 |
| 8 | 10 | 09 | 08 |
| 9 | 07 | 12 | 15 |
| 34 | 10 | 12 | 11 |

| (10) | (20) | (24) |
|---|---|---|
| oz. | dwt. | gr. |
| 204 | 13 | 12 |
| 74 | 12 | 20 |
| 614 | 10 | 12 |
| 90 | 19 | 23 |
| 984 | 16 | 19 |

### *Apothecaries Weight.*

| (10) | (12) | (8 | (3) |
|---|---|---|---|
| ℔ | oz. | gr. | ſ. |
| 48 | 07 | 1 | 1 |
| 74 | 05 | 2 | 2 |
| 17 | 10 | 1 | 1 |
| 10 | 11 | 5 | 2 |
| 17 | 07 | 7 | 1 |
| 10 | 09 | 6 | 2 |
| 180 | 04 | 1 | 0 |

| (19) | (12) | (8) | (3) |
|---|---|---|---|
| ℔ | oz. | gr. | ſ. |
| 74 | 05 | 7 | 1 |
| 19 | 11 | 4 | 1 |
| 18 | 07 | 5 | 2 |
| 14 | 09 | 6 | 2 |
| 10 | 11 | 7 | 7 |
| 11 | 10 | 6 | 1 |
| 150 | 09 | 6 | 0 |

| (10) ℔ | (12) oz. | (8) gr. | (3) *ſ.* |
|---|---|---|---|
| 10 | 10 | 5 | 2 |
| 17 | 11 | 6 | 1 |
| 10 | 10 | 7 | 1 |
| 12 | 14 | 1 | 1 |
| 10 | 10 | 2 | 2 |
| 11 | 11 | 3 | 2 |
| 75 | 06 | 6 | 0 |

### *Cloth Meaſure.*

| (10 *Yd.* | (4) *qrs.* | (4) *N.* |
|---|---|---|
| 14 | 1 | 3 |
| 21 | 2 | 2 |
| 56 | 1 | 0 |
| 42 | 2 | 3 |
| 17 | 0 | 1 |
| 24 | 1 | 2 |
| 176 | 1 | 3 |

| (10) *Ell E* | (5) *qrs.* | (4) *N.* |
|---|---|---|
| 24 | 3 | 3 |
| 17 | 4 | 1 |
| 46 | 2 | 2 |
| 27 | 1 | 0 |
| 34 | 4 | 3 |
| 51 | 2 | 2 |
| 202 | 3 | 3 |

| (10) *Ells F.* | (3) *qrs.* | (4) *N.* |
|---|---|---|
| 25 | 2 | 3 |
| 36 | 1 | 2 |
| 42 | 2 | 3 |
| 54 | 2 | 1 |
| 61 | 1 | 2 |
| 221 | 1 | 3 |

Here I forbear giving Verbal Demonſtrations to any of the Examples above as unneceſſary; but ſet the Numbers to ſtop at, over each Denomination, which makes them very eaſy to caſt up.

The Proof of any of theſe Examples of Adittion is by the ſame Method as directed in thoſe of one Denomination, *viz.* by beginning at the Top, and caſting them downwards till they agree.

# CHAP III.

## SUBTRACTION.

Teaches to take a leſſer Number out of a greater, whereby we find the Reſt, Remainder, Exceſs, or Difference.

In ſubtracting of Numbers of one Denomination they muſt be ſet down for Working as directed in Addition, *viz* Units under Units, Tens under Tens *&c.* but the greater Number muſt be uppermoſt, as in this Example.

| | *Pounds* |
|---|---|
| *Money received* —— | 296 |
| *Money paid* —— | 152 |
| *Remains unpaid*, —— | 144 |

After a Line drawn underneath, I begin at the Right Hand and ſay, 2 from 6 and there remains 4, and 5 from 9 and there remains 4, and 1 from 2 and there remains 1. So there remains in Hand 144 Pounds as in the Work.

Again, Suppoſe I would ſubſtract 496 Pounds from 654 pounds, lent; I ſet the Number down thus, as before directed.

654 *Pounds*
496 *Pounds*

158 *Anſ.*
654 *Proof.*

And here you are eſpecially to note, that when any of the under Figures are greater than the Figure over them, then you muſt borrow 10 ( as you carry'd 10 in Addition) and put it to the Figure or Cypher from whence you are to ſubtract, and then take from their Sum, paying 1 for the ſaid 10 borrowed, to the next Figure towards the Left Hand in the lower Line &c. After a Line drawn under the Numbers I ſay, 6 from 41 cannot, but (putting 10 to the ſaid 4, it is made 14) 6 from 14 and there remains 8, which I ſet down under the Line, then I ſay 1 that I borrow'd and 9 (the next Figure) is 10 from 5 I cannot, but 10 from 15 (adding 10 to the 5) and there remains, 5 which I alſo ſet down: then 1 that I borrow'd and 4 is 5, from 6 and there remains 1, and ſo the Example is done: And I find there remains unpaid 158 pounds as in the ſame Margin may be obſerv'd. To prove this and all other Examples in Subtraction; add the remainder, or Difference to the leſſer Sum, and if it make the upper or greater Number it is right, otherwiſe not: As in the Example I ſay 8 and 6 is 14, 4 and carry 1, 1 and 5 is 6 and 9 is 15, 5 and carry 1, 1 and 1 is 2 and 4 is 6 which Figures agree with the Top Line and ſhew that the Subtraction is right.

*Other Examples for Practice.*

| | lb | | *Ells.* | *Gallons.* | |
|---|---|---|---|---|---|
| Due | 147 | Bought | 7460 | 4175 | From |
| Paid | 79 | Sold | 5967 | 2790 | Take |
| Remainder | 68 | | 1493 | 1385 | |
| Proof | 147 | | 7460 | 4175 | |

*Time*

### *Time*

| | | | |
|---|---|---|---|
| | 1722 | 1722 | 1722 |
| | 1605 Gun-Pow. P. | 1066 *Wm.* I. | 1666 Fire *L* |
| Since | 117 | 656 | 56 |

—— *Note*, this general Rule, that in all Subtractions whether of Money, Weight, Meaſure &c whatever you ſtop at in Addition you muſt borrow in Subſtraction if need require.

### *Subtraction of Money.*

In Subtraction of divers Denominations the ſame Method muſt be obſerv'd as before in Addition, that every Number be ſet in due order with reſpect to the Denomination, that is Pounds under Pounds, Shillings under Shillings, and Pence under Pence, and the greater Number or Sum always uppermoſt, then Note how many of the leaſt Denomination make one of the next greater, beginning at the right-Hand and going towards the Left, and if the Figure or Figures be greater than thoſe you are to ſubſtract from, you muſt borrow 1, from the next greater Denomination, and then Subſtract from it, and add the remainder to the upper Figure.

| | *lb.* | *s.* | *d.* |
|---|---|---|---|
| Receiv'd | 519 | 18 | 4 ¼ |
| Paid | 327 | 11 | 6 ½ |
| Unpaid | 192 | 06 | 09 ¾ |

519:18 4 ¼

*Example.* Let it be required to ſubſtract *l* 327 11, 6 ½ from *l* 519 18*s*, 4*d*. ¼ Having ſet down the two Sums the greater uppermoſt, and the leſſer underneath, as above, having drawn a Line under them, I begin at the right hand ſaying 2 Farthings from 1 I cannot, but borrowing 1 of the next Denomination which are pence, 1 of which makes 4 Farthings 2 from 4 and there remains 2, which added to the Farthing on the Top makes ¾ which I ſet down under the Line, and proceed 1 penny, that I borrowed and 6 is 7, 7 *d*, from 4 *d* I cannot but 7 *d*. from 12 *d*. borrowing 1 *s* the next Denomination and there remains 5 *d* which put to the 4 *d* over it, makes 9 *d* which I alſo ſet down under the Line in its proper Place, then 1 that I borrowed and 11 is 12 from 18 there remains 6 *s* then 7 from 9 and there reſts 2, then 2 from 1 I cannot but 2 from 11 ( putting 1o the 1 as in Subſtraction of one Denomination) and there remains 9, then 1 that I borrowed and 3 is 4 from 5 and there remains 1. So that the Remainder unpaid is, *l.* 192 06 9 ¾ as in the Work.

### *Examples for Practice.*

| | ℔ | *s* | *d* | ℔ | *s.* | *d.* | ℔. | *s* | *d* |
|---|---|---|---|---|---|---|---|---|---|
| Rec'd. | 402 | 10 | 0 | 741 | 16 | 0 | 107 | 10 | 2 |
| Disb. | 361 | 12 | 2 | 392 | 11 | 8 | 98 | 16 | 6 |
| Rem. | 10 | 10 | 10 | 349 | 04 | 4 | 8 | 13 | 8 |
| Proof | 402 | 10 | 0 | 741 | 16 | 0 | 107 | 10 | 2 |

| | l | s. | d. | l. | s. | d. | l. | s. | d. |
|---|---|---|---|---|---|---|---|---|---|
| Rd. | 976 | 11 | 2 ¼ | 471 | 10 | 10 | 2477 | 10 | 0 ½ |
| Pd. | 795 | 16 | 3 ½ | 296 | 17 | 4 ½ | 979 | 16 | 2 ¼ |
| Rm. | 180 | 14 | 10 ¾ | 174 | 13 | 5 ½ | 1497 | 13 | 10 ¼ |

When it happens that a Sum of Money firſt due is paid at ſeveral Payments; or that ſeveral Disburſements are out of a certain Sum receiv'd; then the Money firſt due, or the Money receiv'd, ſtands uppermoſt, with a Line under it, and the ſeveral Payments or Disburſements ſtand in their Order under that Line which muſt be added together, and the Total muſt be Subſtracted from the uppermoſt Line, and the remainder ſhews what remains due, not [illegible] isburſ'd, as in the Example following.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Firſt due, *l.* | 75 | 12 | 6 | Recd *l.* | 275 | 15 | 0 |
| Receiv'd | 06 | 10 | 0 | Diſburſt | 50 | 00 | 0 |
| at ſeveral | 12 | 00 | 0 | on ſeve- | 30 | 10 | 0 |
| times, | 19 | 15 | 6 | ral Oc- | 70 | 10 | 6 |
| | 25 | 00 | 0 | caſions. | 75 | 15 | 0 |
| Recd in all | 63 | 05 | 6 | Diſburſt in all | 226 | 15 | 6 |
| Rem. due | 12 | 07 | 0 | Reſting in hand | 48 | 19 | 6 |
| Proof | 75 | 12 | 6 | | 275 | 15 | 0 |

|  | *l.* | *s.* | *d.* |
|---|---|---|---|
| In a Bag. | 50 | 00 | 0 |
| Paid to ſeveral Per-ſons | 5 | 05 | 0 |
|  | 10 | 10 | 0 |
|  | 7 | 7 | 6 |
|  | 20 | 00 | 0 |
| Paid in all | 43 | 2 | 6 |
| Rem. in Bag | 06 | 17 | 6 |
|  | 50 | 00 | 0 |

Theſe three laſt Examples are ſo pertinently ſet down with reſpect to the foregoing verbal Demonſtration that there is no need of more words for Explication.

*The Proof of Subtraction of Money,* is ever performed in the manner beforemention'd.

### Subſtraction of Averdupoize Weight.

| | (10) Tuns | (20) C. | (4) qrs. | (28) lb. | (10) C. | (4) qrs. | (28) lb. |
|---|---|---|---|---|---|---|---|
| From | 24 | 12 | 3 | 12 | 224 | 1 | 20 |
| Take | 17 | 09 | 3 | 22 | 127 | 2 | 16 |
| Rem. | 7 | 02 | 3 | 18 | 96 | 3 | 04 |
| Proof | 24 | 12 | 3 | 12 | 224 | 1 | 20 |

| (10) C. | (4) q. | (28) lb. | (10) C. | (16) q | (16) lb. |
|---|---|---|---|---|---|
| 431 | 1 | 12 | 75 | 11 | 12 |
| 275 | 2 | 16 | 49 | 13 | 14 |
| 155 | 1 | 24 | 25 | 13 | 14 |
| 431 | 1 | 12 | 75 | 11 | 12 |

| | T. C. q. lb. | | C. q. lb. |
|---|---|---|---|
| Bought | 75 12-1-14 of Iron. | | 437-2-20 of Sugar. |
| Sold at Times, | 5-12-1-16<br>2-00 0-00<br>20-13-3-14<br>16-17-2-20 | Sold at times | 24-1-14<br>124-2-16<br>45-1-17<br>216-3-24 |
| Sold in all | 45-13-3-22 | Sold in all | 411-1-15 |
| R. unſold | 29-18 1-20 | R. unſold | 26-1-05 |
| Proof | 75-12-1-14 | Proof | 437-2-20 |

### *Troy-Weight.*

| | lb. | oz. | dwt. | gr. | | oz. | dwt. | gr. |
|---|---|---|---|---|---|---|---|---|
| | (10) | (12) | (20) | (24) | | (10) | (20) | (24) |
| Bought | 65 | 06 | 10 | 12 | Recd | 5226 | 07 | 22 |
| melt down | 47 | 09 | 11 | 20 | Deliver'd | 3599 | 10 | 16 |
| Remains | 117 | 08 | 18 | 16 | Remains | 1626 | 17 | 06 |

And ſo of Apothecaries Weight, Cloth Meaſure Liquid Meaſure, &c. of which I might give Examples, but they all being work'd after the ſame Method, (having reſpect to the ſeveral Tables of Quantity) I therefore forbear; but ſhall ſubjoin ſome familiar Examples, which ſhew the Intent and Uſes of Subſtraction.

*Ex.* 1. One born in the Year of our Lord 1616, deſired to know his Age in the Year 1676; What was his Age?

| | |
|---|---|
| *Year* | 1676 |
| *Born* | 1616 |
| *Anſ.* | 60 |

*Ex.* 2. Admit a Perſon to be 52 Years old, this preſent Year 1722; What was the Date of the Year he was born in? *Anſw.* In 1670. For ſubſtracting his Age from the preſent Year, the Difference gives the Date of his Birth, as *p.* Example.

| | |
|---|---|
| *Year* | 1722 |
| *Age* | 52 |
| *Auſ.* | 1679 |

*Ex.* 3. Suppoſe I have a large Cask of Tobacco, containing 2724 l. and have ſold at ſeveral times 1966 what remains in the Cask?

| | |
|---|---|
| | 2724 |
| | 1966 |
| *Anſ.* | 758 |

Ex. 4. What number of Pounds added to will make it up to 650

```
        650
        470
        ---
Anſwer, 180
```

Ex. 5. Bought 490 Gallons Brandy, and ſold 327, what remains?

```
        490
        327
        ---
Anſwer, 163
        ---
```

Ex. 6. Admit a Ship hath 922 Leagues to Sail, and hath ſailed 555 how far is to Port?

```
      922
      555
      ---
Anſw. 367 Leagues.
      ---
```

Ex. 7. What Sum of Pounds Shillings and Pence, muſt be added to *l.* 72 06. 8*d.* to make it up *l.* 130 10 *s.* 0*d.* *Anſwer*, *l.* 58 3 4. as in the Work.

```
l. 130-10-0
    72-6 8
   --------
l.  58 3 4
   --------
```

Ex. 8. Suppoſe I have bought Iron, And Sold What remains unſold? *Anſ.*

```
                          T. C. q. lb
Suppoſe I have bought Iron, 24-12-2-20
      And Sold              17-14-1-22
                            ----------
What remains unſold? Anſ.   6-18-0-26
                            ----------
```

CHAP.

Book

# CHAP. IV.

## MULTIPLICATION.

TEaches how to increaſe the greater of two Numbers given as often as there is Units in the leſſer, and compendiouſly performs the Office of Addition. To this Rule belongs three principal Members *viz*.

The { *Multiplicand*, or Number to be multiply'd
*Multiplier*, or Number by which you multiply
*Product*, or Number produc'd by multiplying

But before any Progreſs can be made, the following Table muſt be learnt readily by Heart.

## *Multiplication* TABLE

| | | |
|---|---|---|
| 2 times | 2 is, | 4 |
| | 3 | 6 |
| | 4 | 8 |
| | 5 | 10 |
| | 6 | 12 |
| | 7 | 14 |
| | 8 | 16 |
| | 9 | 18 |
| | 10 | 20 |
| | 11 | 22 |
| | 12 | 24 |
| time | 3 is, | 9 |
| | 4 | 12 |
| | 5 | 15 |
| | 6 | 18 |
| | 7 | 21 |
| | 8 | 24 |
| | 9 | 27 |
| | 10 | 30 |
| | 11 | 33 |
| | 12 | 35 |
| 4 times | 4 is, | 16 |
| | 5 | 20 |
| | 6 | 24 |
| | 7 | 28 |
| | 8 | 32 |
| | 9 | 36 |
| | 10 | 40 |
| | 11 | 44 |
| | 12 | 48 |
| 5 times | 5 is, | 25 |
| | 6 | 30 |
| | 7 | 35 |
| | 8 | 40 |
| | 9 | 45 |
| | 10 | 50 |
| | 11 | 55 |
| | 12 | 60 |
| 6 times | 6 is, | 36 |
| | 7 | 42 |
| | 8 | 48 |
| | 9 | 54 |
| | 10 | 60 |
| | 11 | 66 |
| | 12 | 72 |
| 7 times | 7 is, | 49 |
| | 8 | 56 |
| | 9 | 63 |
| | 10 | 70 |
| | 11 | 77 |
| | 12 | 84 |
| 8 times | 8 is, | 64 |
| | 9 | 72 |
| | 10 | 80 |
| | 11 | 88 |
| | 12 | 96 |
| 9 times | 9 is, | 81 |
| | 10 | 90 |
| | 11 | 99 |
| | 12 | 108 |

The form of this Table I prefer before the *Pythagorean*; made in a Square; as much eaſier for Learners.

When any Number is given to be multiplied by another ſet the biggeſt uppermoſt, which is the Multiplicand, and under that the leſſer, which is your Multiplier and in the ſame Order as in Addition and Subſtraction; *viz.* Units under Units, Tens under Tens, *&c.* then draw a Line, and proceed, beginning at the right Hand; to wit, at the place of Units, and multiply every Figure of the Multiplicand, by the Figure (or Figures) of the Multiplier; and ſo proceed towards the left hand, ſetting down each particular Product (if under ten) under the Line, in order as you proceed; but when the Product of any two Figures amounts to 10, or juſt to any certain Number of Tens, as 20, 30, 40, *&c.* ſet down a Cypher, or 0, and carry 1 for every 10, (as in Addition) to the Product of the next Figure; but if it comes under 10, or above Ten, or Tens, ſet down the Figure under; or the Exceſs above Ten, or Tens, and carry 1 for every 10, as aforeſaid: And when you come to the laſt Figure of the Multiplicand, ſet down the whole Product of that Figure. Theſe Directions are fully demonſtrated by the Example following.

| | | |
|---|---|---|
| **Multiply** | 8752 | **Multiplicand** |
| **By** | 5 | **Multiplier** |
| | 43760 | **Product** |

**After the Example is ſet down as before directed with a Line drawn underneath, I begin at the right hand ſaying 5 times 2 is 10; and it being juſt 10, and nothing over or under, I ſet down 0, and carry**

1 to the next ; then 5 times 5 is 25, and 1 that I carry is 26, I ſet down 6 and carry 2 for the two Tens, then 5 times 7 is 35, and 2 that I carry is 37 I ſet down 7, and carry 3, laſtly 5 times 8 is 40, and 3 that I carry is 43, which being the laſt Product. I ſet down as above directed. So the whole Product of 8752 multiply'd by 5 is 43760, as you may prove by Addition, ſetting down 8752, 5 times, and adding them up, which ſhews as was ſaid in the definition that Multiplication compendiouſly performs the Work of Addition.

*More Examples for Practice by a ſingle Figure.*

| | | | |
|---|---|---|---|
| Multiplicand | 47962 | 275460 | 479692 |
| Multiplier | 4 | 6 | 7 |
| Product | 191848 | 1652760 | 3357844 |

| | |
|---|---|
| 459240 | 7420067 |
| 8 | 9 |
| 3673920 | 66780603 |

When there are more Multipliers than one, there muſt be ſo many particular Products to find out the whole Product, that is each Factor muſt have its own Product ſet down in due form, by one remove toward the Left-hand after the Product by the firſt Figure then the ſeveral Products, are added together which Total is the Whole, or general Reſult. As in this Example.

Multiply 479620
By 789

The ſeve-ral Products { 4316580
3836960
3357340

The whole Pr. 378420180

In this Example I begin at the place of Units ſaying, 9 times 0 is 0, and 9 times 2 is 18, 8 and carry 1, and 9 times 6 is 54 and 1 I carry is 55, &c. and the firſt Product by 9 the firſt Figure is 4316580. Then I begin with 8 the ſecond Figure in the Multiplier, ſaying 8 times 0 is 0, which I ſet down juſt under the multiplying Figure and 8 2 is 16, 6 and carry 1 and 8 times 6 is 48, and 1 I carry is 49, 9 and carry 4, 8 times 9 is 72 and 4 is 76, &c. And the ſecond Product by the Figure 8, is 3836960. Laſtly I multiply the whole Multiplicand by the Figure 7, and the Product by that is 3357340, which three Products added together make 378420180 for the whole Product 479620 multiply'd by 789 See the Work.

*To multiply by* 10, 100, 1000, *&c.*

Obſerve how many Cyphers there are in the Multiplier annex thoſe Cyphers to your Multiplicand; and your Work is done.

| | | |
|---|---|---|
| 45768 | 54321 | 47659 |
| 10 | 100 | 1000 |
| 457680 | 5432100 | 47659000 |

*To multiply by* 30 40, 50, 600, *&c.*

Multiply by the Figures and annex the Cyphers, or ſet down the Cyphers firſt, then multiply by the Figures.

*Examples.*

| | | | |
|---|---|---|---|
| 3721 | 4777 | 6789 | 45678 |
| 30 | 40 | 50 | 600 |
| 111630 | 191080 | 37450 | 27406800 |

*To multiply by* 11, 12, 110, 120 1100, 1200, *&c.*

Multiply by 11 or 12, ſo as to have the Product in one Line, and then annex the Cypher or Cyphers; as in theſe Examples.

| | | | |
|---|---|---|---|
| 2476 | 5796 | 4625 | 5765 |
| 11 | 12 | 110 | 120 |
| 27236 | 69552 | 508750 | 691800 |

| | |
|---|---|
| 74562 | 4794 |
| 1100 | 1200 |
| 82018200 | 5752800 |

*To multiply by a mixt Number, that is a whole Number with a Fraction belonging to it, as* $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ $\frac{2}{3}$, *&c.*

Multiply firſt by the whole Number, and then take $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, $\frac{2}{3}$, &c. of the Multiplicand, and add that, and the Product by the whole Number, together.

| *Pieces* | *Barrels* |
|---|---|
| 24 | 252 |
| Each 9 Yds $\frac{1}{4}$ | Each 2 C $\frac{1}{2}$ |
| 216 | 504 |
| $\frac{1}{4}$ of 24 6 | $\frac{1}{2}$ of 252 126 |
| Yards in all 222 | Hund. in all 630 |

| Bags | Casks | Pieces |
|---|---|---|
| 119 | 26 | 424 |
| Each 4C. $\frac{3}{4}$ | Each 3C. $\frac{2}{3}$ | Each 24*E* $\frac{1}{5}$ |
| 476 | 78 | 1696 |
| $\frac{3}{4}$ of 119 $\left\{\begin{matrix} 59\ \frac{1}{2} \\ 29\ \frac{3}{4}\end{matrix}\right.$ | $\frac{2}{3}$ of 26 $\left\{\begin{matrix} 8\ \frac{2}{3} \\ 8\ \frac{2}{3}\end{matrix}\right.$ | 848<br>$\frac{1}{5}$ of 424 $\{$ 84 $\frac{4}{5}$ |
| C. 565 $\frac{1}{4}$ | 95 $\frac{1}{3}$ | 10260 $\frac{4}{5}$ |

*Examples for Practice.*

| | |
|---|---|
| 15257879 | 50710984 |
| 5400302 | 4050607 |
| 30515758 | 354976888 |
| 457736370 | 3042659040 |
| 6103151600 | 2535549200 |
| 76289395 | 2028439360 |
| 82397154479458 | 205410266767288 |

*Ex.* 3. If 63 Gallons makes 1 Hogſhead, how many Gallons in 80 Hogſheads?

63

*Anſwer* 5040 Gallons.

*The*

## *The Proof of Multiplication.*

Multiplication may be prov'd by multiplying the Multiplier by the Multiplicand, and if the Figures prove the ſame, as by muliplying the Multiplicand by the Multiplier you may conclude it Right. Or according to the School Method, by caſting out the Nines out of the Multiplier, and ſetting the overplus on the left ſide, of the X, made for the Proof then the Nines are caſt out of the Multiplicand, and the overplus ſet on the right ſide, then thoſe two Figures are multiply'd into each other, and the Nines if any are caſt out of that Product, and what remains is ſet on the Top of the Croſs. Laſtly, the Nines are caſt out of the whole Product, and if the remaining Figure agrees with the Top, the Work is judged right and 'tis ſet at the bottom of the Croſs.

*Example.* 9)48(9

```
 5678          3
   24        6 X 8 Proof
 -----         3
 22712
11356
 ------
136272
```

What may be ſaid in Favour of this Method of Proof is, that when a Sum is done right, it never appears wrong by this Way, but it too often makes Sums appear right when they are notoriouſly falſe but the ſureſt rule of Proof, is by Diviſion, and till that is learnt the other is made Uſe of.

CHAP.

# CHAP. V.

## DIVISION.

DIVISION teaches us to know how often one Number is contained in another or how to divide a Number into what Number of parts we pleaſe. In this Rule there are three Members real, and a fourth Accidental, *viz*.

*Viz*. 1. The *Dividend*, or Number to be divided
2 The *Diviſor*, or Number by which you divide.
3. The *Quotient*, or Number that ſhews how often the Diviſor is contain'd in the Dividend

——Note, Always the Remainder is leſs than the Diviſor, or the Work is falſe.

*Dic quot, multiplica, ſubduc, transferque ſecundum*.

*A General Rule*.

1. Seek. 2. Multiply. 3. Subſtract.

*Example*, 1. Divide 4724 Pounds in 4 equal Parts To do this, ſet down the Number with the Diviſor before it in a Semicircle thus 4) 4724 then draw a Line under, and ask how oft 4 the Diviſor in 4 the firſt Figure in the Dividend, which is once which I ſet under the Line thus :

4) 4724
———
1181

Then once 4 is 4, from 4, and there remains 0, then how many times 4 in 7? once, which is ſet under the Line thus:

4 ) 4724

1181

Then once 4 is 4, from 7 and there remains 3, which ſuppoſed to ſtand before the 2 in the Dividend makes it 32; then the Fours in 32? *Anſwer* 8 times, which ſet under the Line alſo thus,

4 ) 4724

1181

Laſtly, how many times 4 in 4, once; then once 4 is 4, then 4 from 4 and there remains nothing, and the work is done, and ſtands thus;

4 ) 4724

Quotient 1181

And ſhews that 4 is contain'd in 4724 juſt 1181 and nothing remains, or 4724 Farthings divided 4 quotes 1181 pence for Anſwer.

*Ex.* 2 A ſecond Example may be this; Divide 247962 by 7, having ſet down the Example as above, I proceed according to the above general Rule.

Diviſor 7 ) 247962 Dividend

Quotient 35423—1 Remainder.
7

247962 *Proof*

First I ſeek how oſt 7 is contained in 2, the Anſwer is 0, but I muſt not ſet down 0, in the firſt place; (tho' at other times) becauſe in natural numbers, 0 on the left hand of ſignificant Figures, neither increaſes nor diminiſhes the Number; wherefore if you can't have the Diviſor out of the firſt Figure of the Dividend. take it out of the two firſt Figures; as here, I ſay how many times 7 in 24? the Anſwer is 3 times, wherefore I ſet down 3 directly under the 4 in the dividend (becauſe I do not take the Diviſor 7, out of 2, but out of 24) then according to the general Rule, I multiply, ſaying 3 times 7 (the Diviſor) is 21, which I ſubtract from 24 and there remains 3. which being three Tens, make the next Figure 7 to be 37 then the ſevens in 37 is 5 times, 5 times 7 is 35 from 37 and there remains 2. then the ſevens in 29 4 times, 4 times 7 is 28, from 29 and remains 1 then the ſevens in 16 twice; twice 7 is 14, from and there remains 2. Laſtly, the 7 in 22, 3 times 3 times 7 is 21 from 22 and 1 is the remainder and the Work done. So 7 is contain'd in 246772 352523 times and 1 over.. For the Proof, I multiply the Quotient by the Diviſor 7, taking in the remainder 1, and the Product correſponds exactly with the Dividend, wherefore I juſtly conclude the Diviſion truly wrought, ſee the Operation.

*More*

## *More Examples.*

*Dividend*
*Divisor* 3)45678    4)275060    5(3972460

*Quot.* 15226    68765    794492

6)479620    7)987654

79936--4 Rr.    141093--3

*Diviſor* 8)93176542

*Quotient* 1164 067--6 *Remainder.*
8

*Proof* 93176542

As in *Multiplication*, for Expedition you Multiply'd by 11 and 12 *&c.* to have the Product in one Line, ſo in this Rule, for the ſame Reaſon you are to divide by 11 and 12 *&c.* as by a ſingle Figure as in the ſubſequent Examples.

11)34567    12)54321    11)47621    12)79520

3142-5    4526-9    4329-2    6635

### *Contractions in Diviſion.*

When the Diviſor hath one or more Cyphers, on the right hand, cut them off by a down right ſtroke of the Pen, thus 4 | 00 or by a Comma thus 4,00; and likewiſe daſh of as many Figures or Cyphers from the Dividend thus; 4,00 (-724,02 ) and what you ſo cut off, is the remainder or Part of it. So that if you divide by 10. 100, 1000, &c. only ſeperate ſomany Figures or Cyphers from the right of the Dividend, and the Work is done. The Figures towards the left hand is the Quotient, and thoſe towards the right are the Remainder.

*Example.*

1,0)39,5 ——— 39·5

1,00)749,60 ——— 749·60

1,000)597,860 ——— 597·860

Or if you have ſignificant Figures, that do divide, and Cyphers belonging to them, for a diviſor cut off the Cyphers in the Diviſor, and as many Figures or Cyphers from the dividend, and then divide the remaining Figures of the dividend, by the remaining Figures of the Diviſor. As in theſe Examples.

3,0)375,6 ——— 125-6

6,00)79942,00 ——— 13323 400

*Diviſion* by two or more Figures, is accounted the hardeſt Leſſon in Arithmetick, yet I will endeavour to make that ſeemingly hard Task, plain ſmooth and eaſy, to the meaneſt Capacity; and firſt it is neceſſary to obſerve the following plain and eaſy Heads, or Notes for the Rule of Working, *viz.*

1. So many Figures or Places, as are in your Diviſor, you muſt point out ſo many in your Dividend for your firſt Dividual, except the firſt Figure of

Your Diviſor exceed, the firſt of your Dividend, then you go a Figure further, towards the right hand, and make your Point there; ſo then your Dividual mark'd out hath a Figure more than your Diviſor, and then the firſt of your Diviſor is taken out of the two firſt Figures of your Dividual.

2. You never place a Cypher in the Quotient the firſt time you take (as was ſaid before) the Diviſor out of the Dividend.

3. You never exceed 9, in the times you take the Diviſor out of the Dividual.

4. The Dividual never exceeds the Diviſor above one Figure.

5. You never bring down but one Figure or Cypher at a time out of the Dividend.

6. For every Figure or Cypher brought down from the dividend, there muſt be one Figure or Cypher plac'd in the Quotient.

7. When you cannot take the Diviſor out of the Dividual, you muſt put a Cypher into the Quotient, and bring down another Figure, and if you cannot do neither, you muſt place another Cypher &c.

8. When at any time after Subtraction there remains 0, and there remains nothing in the Dividend but Cyphers, you muſt then put them in the Quotient as part of it, and the Work is done.

Divide 47932 by 38, after the Sum is ſet down for working thus——I begin according to the general Rule and ſeek 38)47932( how oft I can take 3 the firſt Figure of the Diviſor, out of 4 the firſt Figure of the dividend? And the Anſwer is once; wherefore I ſet down 1 in the Quotient, and then the work ſtands thus;

38)47932(1

And having made a Point under 7 for a dividual, according to the ſecond Article in the general Rule I multiply the diviſor by 1 the Figure plac'd in the quotient, ſaying, once 8 is 8, which I put juſt under 7 (where the point is) in the dividend, and once 3 is 3, which I place under 4 in the dividend, and then the Work appears thus:

38)47932(1

38

And 38 ſtands in form to be ſubtracted from 47; wherefore according to the laſt Article in the ſaid general Rule, after having drawn a ſhort Line, I ſubtract, ſaying, 8 from 7 I cannot, but 8 from 17 and there remains 9; then 1 that I borrow'd, and 3 is 4, from 4, and there remains 0, but I do not ſet it down becauſe it's the laſt place; and Cyphers towards the left-hand, in whole Numbers, ſignifiy nothing, and then the Work ſtands thus:

38)47932)1

. .

38

---

9

Then I make a Point under 9 the next figure of the dividend (which point is a ſign of the figures being brought down) ſetting it on the right of the remainder 9, and then I have 99 for a new dividual; then I ſeek again, and ask how oft 3 the firſt figure in the diviſor, can be had in 9, the firſt figure in the dividual 99? the Anſwer is 3 times; but before I ſet down 3 in the quotient, 'tis neceſſary to try whether it will go ſo many times, to prevent blots by alteration of figures, wherefore I multiply the diviſor by 3 for tryal, and ſay 3 times 8, is 24, 4 and carry 2 (which I do in my Mind, and not ſet it down) and 3 times 3 is 9, and 2 is 11, now 11 cannot be taken out of 9, wherefore I take a Unit, or 1 leſs, and place 2 in the Quotient, and multiply the Diviſor by it, ſaying, twice 8 is 16, 6 and carry 1, and twice 3 is 6, and 1 is 7, and then the Work ſtands thus;

```
38)47932(12
   38
   ——
   99
   76
   ——
   23
```

Then after a Line drawn I ſubtract, ſaying, 6 from 9, reſt; 3 and 7 from 9, remains 2; then I make a point under 3 in the dividend, and bring it down and ſet it on the right of the remainder 23, then I have 233 for a dividual, and the work appears thus:

```
38)47932(126
     ..
   38
   ——
   99
   76
   ——
   233
   228
   ———
     5
```

So I ſeek again, asking how oft 3 the firſt of the diviſor, in 23, the two firſt of the dividuals? becauſe there is a Figure more in the dividual than in the diviſor, (which when ſo, is ever the practice) the Anſwer is, 7 times; but on Tryal, I find it will not go ſo many times, but finding it will bear 6 times, I ſet down 6 in the Quotient, and multiply by it, ſaying, 6 times 8 is 48, 8 and carry 4, and 6 times 3 is 18 and 4 is 22, ſo that 228 ſtand under 233, for ſubtraction, which done the remainder is 5, as in the Example.

Laſtly, I make a point under 2, the only remaining Figure of the dividend, and ſet it on the right of 5 the remainder, and then there is 52 for the laſt dividual: Now I ask, how oft 3 in 5 the Number of Figures both of diviſor and dividual, being equal, *viz.* 2 the Anſwer is once; wherefore I ~~put 1~~ in the Quotient, and multiply the divi~~ſor 38 b~~y it, which ſtill is 38 becauſe it neither multiplies, or divides, which ſubtracted from 52 leaves 14 for the remainder; ſo the whole Work done, ſtands as beneath, and ſhews, that 38 is contain'd in 47932, 1261 times, and 14 over, which 14 is a Fraction or 14 Parts of 38.

```
38)47932(1261
   38...
   ---
    99
    76
   ---
   233
   228
   ---
    52
    38
   ---
   (14)
```

*Ex.* 2 Divide 345678901 by 2345

```
2345)345678901(147411
     2345.....         2345
     ----            -------
     11117            737061
      9380           589644
     ----            442234
      17378          294822
      16415 -------
     ------ 345678901 Proof
       9639 -------
       9380
      ------
        2590
        2345
       ------
        2451
        2345
       ------
        (106)
```

Stephen Stapleton

In the aforeſaid Example, firſt I take once, which ſubtracted as in the Work, leaves 1111, to which I bring down 7, and then I take 4 times, and multiply the diviſor by it, and it makes 9380, which ſubtracted according to Rule, leaves 1737, to which I bring down 8 from the dividend, then I ſeek again and find I can take 7 times, which I place in the quotient, and multiply the diviſor by 7, and it produces 16415, which ſubtracted from 17378 leaves, 963, to which I bring down 9 from the dividend and then I have 9639 for a dividual, then I ſeek again, and take 4 times the diviſor multiply'd by it produces 9380, which taken from 9639 there remain mains 259, to which I bring down the o Cypher from the Dividend, and there is 2590 for a Dividual; ſo I ſeek again, and take once which deducted from 2590, leaves 245, to which bring down 1, the laſt Figure in the Dividend, and there is 2451 for the laſt Dividual, and I take once more, and place it in the Quotient, which taken from 2451, leaves 106 for the Remainder ſo the whole Operation is finiſh'd. Multiply the Quotient by the Diviſor, taking in the Remainder, the Product is 345678901, the ſame Figures with the Dividend which proves the Work right. And thus all Sums in Diviſion are done by repeating the aforeſaid general Rule of Seeking Multiplying and Subſtracting for every Figure or Cypher brought down from the Dividend, till the whole is finiſhed, as is fully demonſtrated in the laſt Example, and further exemplify'd in theſe.

| *Examples* 3. | *Examples* 4. |
|---|---|
| 960(921408,1(9598 | 786(97645)124 |
| 864 . . . | 786 . . |
| 574 | 1904 |
| 480 | 1572 |
| 940 | 3325 |
| 864 | 3144. |
| 768 | (181) |
| 768 | |
| (1) | |

In the 3d Example I ſeperate the 0 from the Diviſor 960, and likewiſe 1, the laſt Figure of the Dividend and then divide only by 96, according to the foregoing Rules of Contraction, and in beginning the Work I find I cannot take 96 out of 92, wherefore I make a point under 1 for the firſt Dividual, and then I ſeek how oft 9 is contain'd in 92 ? in conformity to the firſt Head or Note, for the Rule of Working before-mentioned, &c.

The 4th. Example is eaſy and obvious by the work to any Capcaity, and therefore needs no Explanation, I ſhall now ſet down ſome Examples with their Quotients and Remainders, omitting the Operation as a Touch-ſtone to the learner's Ingenuity

Divide 123456789 by 29 the quotient is 4257130 and the Remainder 19.

If you divide 7400690042 by 987 the quotient muſt be 749816620 and the remainder 260

Again, divide 479679002742 by 4687; the Quotient is 102298784 and the Remainder 45566——

And if you divide the ſame Number by 4200674 then the quotient will be 114190 and the remainder 4038682.

### The Proof of Multiplication.

Is moſt infallibly done by Diviſion, as was ſaid in the Rule of Multiplication, for if you divide the product by the Multiplier, the quotient will be equal to the Multiplicand, if ſo, the Work is right, otherwiſe not.

For tryal, we'll take the Example in Multiplication, which was prov'd by the Croſs, *viz.*

5678

```
      5678
        24
     -----
     22712
    11356
    ------
24) 136272(5678 Proof
    ....
    120
    ---
     162
     144
     ---
      187
      168
      ---
       192
       192
       ---
       (0)
```

So Diviſion is reciprocally proved by Multiplication, as in the ſecond Example of Diviſion by 2 or more Figures.

*More Examples.*

*Ex.* 1. Divide 5792 Pounds, equally among 8 Perſons, how much muſt each have to his Share ? Anſwer, 724 Pounds each.

*Ex.* Divide 8760 hours ( thoſe in a Year ) by 24 ( thoſe in a day ) how many Days in a Year ? *Anſw.* 365 Days.

*Ex.* Divide 31680 ſuperficial ſquare Inches, by 144, the Inches in a ſuperficial ſquare Foot, and tell me how many ſquare Feet there are in them. *Anſw.* 220 ſquare Feet.

Ex. 4. Divide 93311 ſolid Inches by 1728, the Inches in a ſolid Foot, and tell me the ſolid Feet in that piece of Timber that contains thoſe Inches?

Anſwer, 54 ſolid Feet.

---

## *CHAP.* III.

# REDUCTION

IS an application of Multiplication and Diviſion ſhewing how to reduce Numbers of one Denomination to another; thereby diſcovering the ſame Value, tho' in different Terms.

As firſt, all great Numbers are brought into ſmaller by Multiplication; as Pounds into Shillings Pence and Farthings, by multiplying by 20, 12, and 4; or Hundreds Weight into Pounds Weight by multiplying by 4, and then by 28; or lower into ounces, and Drams, by multiplying by 16 and 16.

Secondly, On the contrary, all ſmall Names are brought into greater by Diviſion, as Farthings into Pounds, by dividing by 4, 12, and 20; and Pounds Weight into Hundreds Weight, by dividing by 112, or by 28 and 4, and Drams into Pounds, by dividing by 16 and 16

But the following Tables will be very uſeful for the ready reducing any thing of one Denomination to another.

*Money*

| *Money* | | *Avoirdupoiz Wt.* | |
|---|---|---|---|
| In a Pound, or 20s, are, | 1 Mark and half<br>2 Angels<br>3 Nobles<br>4 Crowns<br>8 Half-Crowns<br>20 Shillings<br>40 Sixpences<br>60 Groats<br>240 Pence<br>960 Farthings | In a Tun are, | 20 C.<br>80 Quarters<br>2240 ℔<br>35840 Oz.<br>573440 Drams |
| | | In a C. Wt. | 112 ℔<br>1792 Oz.<br>28672 Drams |
| | | In a ℔ | 16 Ounces<br>256 Drams |

### *Troy-Weight.*

In a Pound, or 12 Ounces, are, 12 *Oz.* 240 *dwt* 5760 Grains.

### *Apothecaries-Weight.*

In a ℔ are, 12 *oz.* 96 Drams, 280 Scruples 5760 Grains.

— Note, 1 ℔ *Avoirdupoize, is equal to* 14 *Oz.* 12 *dwt. Troy. and* 1 ℔ *Troy is equal to* 13 *Oz.* 2. *Drams and a half Avoirdupoiz*

### *Long Meaſure.*

In a Mile are, 8 Furlongs, 320 Poles, 1760 Yards 5280 Feet, 63360 Inches, and 190080 Barley-Corns

In a Furlong are, 40 Poles, 220 Yards, 660 Feet, 7920 Inches, 23760 Barley-Corns.

— *Five Feet is a Geometrical Pace.*

### *Dry Meaſure.*

In a Laſt are, 2 Weys. 10 Quarters, 80 Buſhels, 320 Pecks, 640 Gallons, and 5120 Pints.

In a Wey are 5 Quarters, 40 Buſhels, 160 Pecks 320 Gallons, 2560 Pints. 8 buſhel 1 Quarter.

— *A Gallon is* 277 *ſolid Inches and a quarter.*

*Wine*

### *Wine Meaſure*

In the Tun are, 2 Butts or Pipes, 4 Hogſheads, 6 Tierce, 252 Gallons, 504 Pottles, 1008 Quarts, 2016 Pints.

In a Pipe or Butt, 2 Hogſheads, 3 Tierces, 126 Gallons, 252 Pottles, 504 Quarts, 1008 Pints.

### *Beer Meaſure*

In a Barrel 2 Kilderkins, 4 Firkins, 36 Gallons 72 Pottles, 144 Quarts, 288 Pints.

### *Ale Meaſure*

In a Barrel 2 Kilderkins, 4 Firkins 32 Gallons 64 Pottles, 128 Quarts, 256 Pints.

— The beer and ale Gallon are the ſame, *viz.* 282 ſolid Inches, but their barrel is greater than the Ale barrel by 1128 ſolid Inches, or 4 Gallons

In a Hogſhead, 1 Tierce and a half, 63 Gallons. 126 Pottles, 252 Quarts, 504 Pints

In a Tierce, 24 Gallons, 84 Pottles, 168 Quarts 336 Pints.

—— The Wine Gallon contains 231 ſolid Inches, by which all Liquors are meaſured, except Beer and Ale.

MONEY.

## MONEY.

*Example*, 1.

Reduce 348 *l.* into Shillings, pence, and farthings
20 Shillings 1 Pound,

---

6960 Shillings in 348 *l.*
12 Pence 1 Shilling

---

83520 Pence in 348 *l.*
4 Farthings 1 Penny.

---

334080 Farthings in 348 *l.*

---

In this Example there is a greater Denomination to be brought into a leſſer, which according to the foregoing Rule, is done by Multiplication; wherefore I multiply 348 *l.* by 20, to bring them into ſhillings, and the ſhillings by 12 to bring 'em into pence; and laſtly, the pence by 4 to bring 'em into farthings, as in the Example.

(4
*Ex.* 2. In 334080 Farthings, how many Pence, Shillings, and Pounds ?

12 ) 83520 Pence.
2,0 696,0 Shillings.

*l.* 348

This Example requires a ſmall Name to be brought into a greater, done by Diviſion, according to Rule in the definition of Reduction, (which is the reverſe of the firſt Example and ſerves for its Proof.

Proof; for Reduction aſcending and deſcending, mutually prove each other, as Multiplication and Diviſion do, becauſe wrought by 'em) wherefore I divide the Farthings by 4, to bring them into Pence, and the Pence by 12, to bring them into Shillings; and the Shillings by 20, to bring 'em into Pounds.

*N. B.* In dividing by 20, I ſeperate the 0, from it, and likewiſe the Cypher from the Dividend, and then halve the Figure towards the left hand (which is the ſhorteſt way of dividing by 20) ſaying The half of 6 is 3, and the half of 9 is 4, and there remains one Ten, which makes the 6 16; then the half of 16 is 8, and is *l.* 348 as in the Work.

*l.* *s.* *d.*
*Ex.* 3 In 476, 15, 6 $\frac{3}{4}$ how many Farthings?
20

9535
12

114426

4
457707 Farthings

In this Example I multiply by 20, and take in the 15, ſaying, 0 is 0, but 5 is 5; then twice 6 is 12, and 1 (in the 15 being taken in, in the place of Tens) is 13, 3 and carry 1, and twice 7 is 14, and 1 is 15, 5 and carry 1, and twice 4 is 8 and 1 is 9: So that in *l.* 476, 15, there are 9535 *s.* which I multiply by 12, and take in the 6 Pence, ſaying, 12 times 5 is 60, and the 6 pence is 66, 6 and carry 6 and 12 times 3 is 36, and 6 is 42, 2, and carry 4, and 12 times 5 is 60 and 4 is 64, 4 and carry 6, and 12 times 9 is 108, and 6 is 114, which I ſet down, and ſhews that in *l.* 476, 15, there are 114426 Pence; which laſtly I multiply by 4, and take in the three Farthings, ſaying, 4 times 6 is 24, and 3 is 27, 7 and carry 2, and 4 times 2 is 8, and 2 is 10, 0, and carry 1, and 4 times 4 is 16, and 1 is 17, 7 and carry 1, and 4 times 1 is 4 and 1 is 5, and 4 times 1 is 4: So the Work is done, and ſhews that in *l.* 476, 15, 6 $\frac{3}{4}$ there are 457707 Farthings.

4

Ex. 4. In 457707 Farthings, how many Pounds?

12(114426 $\frac{1}{4}$

2, 0 953, 5. 6 *d.*

*Anſw. l.* 476, 15, 6 $\frac{3}{4}$.

This Example being a ſmall name to be brought into a greater, it is done by Diviſion, and divided by 4, by 12, and by 20, gives 476 *l.* and 15 *s.* 6 *d.* $\frac{3}{4}$ remain in their proper places as they were taken in, and is a Proof to the 3d Example, as that (if this had been done firſt) might be to this.

### *Examples for Practice.*

5. In 47969 *l.* 1 *s.* 8 *d.* $\frac{1}{2}$. how many Farthings?
*Anſwer*, 46051186 Farthings.
6. In 4554929 Farthings, how many Pounds. &c.
*Anſwer*, *l.* 4744, 14, 4 $\frac{1}{2}$
7. In 4276 *l.* 12 *s.* 9 *d.* how many Pence?
*Anſwer*, 1026393 Pence.
8 In 10318080 Half-pence, how many Pounds?
*Anſwer*, 21496 *l.*

COINS,

## COINS.

In Reduction of Coin, the ſeveral Species muſt be of one Name, that is, the dividend and Diviſor are to be of one Kind, *viz.* both Pence both, Shillings, both Farthings or Half-pence; Divide the greater by the leſſer Number, and the Quotient will be the Anſwer: And the remainder will be of the ſame Name with your Dividend, or Diviſor, for they are to be both alike.

**Ex.** 1. In 357 *l.* 14 *s.* 6 *d* how many Dollars at 4 *s.* 6 *d.*? Anſ. 1589 $\frac{45}{54}$.

```
     20         at 4 s.  6 d.
   ----             12
   7154           ----
     12             54
 ---------        ----
 54)85854(1589
    54 ...
    -----
     318
     217
    -----
     485
     432
    -----
     534
     486
    -----
     (48)
```

Here *l.* 357, 14, 6 ſterling, is brought into pence and make 85854 pence for a dividend, and likewiſe the Dollar; and it makes 54 Pence for a Diviſor; which agreeable to the foregoing Rule of *Direction*, are both one Name, to wit, *Pence*, which divided according to Rule, quotes 1589 *Dollars*, and 46 *Pence* remain or 4 *s.* the ſame Name with the *Dividend* and *Diviſor*, as in the Operation may be ſeen.

*Ex* 2 In *l.* 357, 14, 6, how many Ducats at 20 3 *s* 9 *d* $\frac{1}{4}$? *Anſ.* 1897, $\frac{5}{8}$ $\frac{9}{1}$

```
       7154
         12
      85854
          4
181)343416(1897
      181...
      1624
      1448
      1761
      1629
       1326
       1267
       (59)
```

In this ſecond Example, both the Sterling Money and Ducat are brought into Farthings, and then the greater, divided by the leſſer Number, and the Quotient is 1897Ducats and 5 Farthings, remain, or 14 *d.* 3 farthings. See the Work *Ex.*

*Ex.* 3. In *l.* 425, 12, 6, how many half Crowns? *Anſw.* 3413. You may bring *l.* 426, 12 6 into Pence, and divide 20, the Pence in Half a Crown, or work ſooner, by multiplying by 8, the Half Crowns in a Pound, and take in 5, the Half Crowns in 12 *s.* 6 *d.*

*Ex.* 4 In 11083 Nobles at 6 *s.* 8 *d.* how many Pounds, *&c.* *Anſwer*, *l.* 3694, 6, 8. In this Example you muliply the Nobles by 80, the Pence in a Noble, and that brings them into Pence, which divide by 122 and by 20.

*Ex* 5 In 31849, 06, 8, how many Marks at 13 *s.* 4 *d.*? *Anſwer*, 4774. Bring the given Sum into Pence, and 13 *s.* 4 *d.* alſo into Pence, and divide the greater by the leſſer, and the Anſwer will be 47774.

*Ex.* 6 In 4774 Marks, how many Pounds *&c.* *Anſw.* *l.* 31849, 6, 8, Work as in the 4th Example.

*Ex.* In 1725, 19, 4, how many Florins, at 2 *s.* 2. *Anſw.* 15932. Work this according to the 5th Example.

*Ex.* 8. In 44556 Rix-Dollars, at 4 *s* 8*d*, how many Pounds Sterling?

*Anſw.* *l* 10396 8, 0. Here Work as in the 4th Example.

*Ex* 9. In 1276 *Moyadores* at 26 *s* 6, how many *Guineas* at 21 *s* *Anſw.* 1651 $\frac{4}{21}$.

Multiply the Number of Moyadoes by the pence in 25 *s.* 6, and then divide by the Pence in 21 *s.* and the Quotient will be the Anſwer aforeſaid.

*Ex* 10 In 3721 *Livers* at 20 *d.* how many Pieces of *Eight* at 4 *s.* 4? *Anſw.* 1431 $\frac{8}{12}$. Multiply by 20, and divide by 52.

## *AVOIRDUPOIZE WEIGHT.*

C. *q.* lb.
*Ex.* 11. In 44, 3, 24. how many Pounds?
4 *Anſw* 5036

179
28

1436
3560

5036

This is a great Name to be brought into a ſmaller and therefore done by Multiplication, as in the Work.

| | | | | |
|---|---|---|---|---|
| Tuns | Multiply'd by | 20 | Produce | Hundreds Weight, |
| Hundreds | | 4 | | Quarters |
| Quarters | | 28 | | Pounds |
| Pounds | | 16 | | Ounces |
| Ounces | | 16 | | Drams |

And the contrary by Diviſion.

I multiply the 44 C. by 4, taking in the 3 Quarters, and the Product is Quarters, which Quarters multiply'd by 28, prodcues the anſwer in Pounds *viz.* 5036 as in the Work.

*Ex.* 12. In 52564 Pounds, how many Hundreds, *&c.*

*Anſwer*, 476 C. 1 Qr. 24 *lb.*

Divide the Pounds by 28, and then that Quotient by 4; or elſe the Pounds 53364, by 112, the Pounds in a C. Weight.

— Always remember when you multiply, to take in the odd Money, Weight, Meaſure &c. in their places, and when you divide, the ſame will be Remainders.

C. *qrs.* ℔.
*Ex.* 13 In 3175 2, 14 how many Tuns, &c.
*Tuns*, C. *qrs.* ℔.
*Anſw.* 158, 15, 2, 14,
Divide by 20, becauſe 20 C. make a Tun.

*Tuns* C. *q.* ℔. *oz.* *dr.*
*Ex.* 14. In 4724, 15, 3 26, 13. 14, how many Drams?
*Anſw.* 2709389022.

Multiply by 20, and take in the 15 C. then by 4 taking in the 3 *qrs.* then by 28, and take in the 26 ℔. and then by 16 and 16, taking in the Ounces and Drams.

C. *qrs.* ℔.
*Ex.* 15 316, 3, 24 of Tobacco how many Boxes each? 75 *lb.* $\frac{1}{2}$
*Anſwer*, 470 Boxes and 30 *lb.* over.

Bring the groſs Weight into Pounds and multiply by 2, which brings 'em into Half Pounds then bring the 75 *lb.* $\frac{1}{2}$ into Half Pounds alſo by multiplying the 75 by 2. and taking in the 1, that ſtands over the 2, and then divide the greater by the leſſer, And thus all *Queſtions*, of this kind are done agreeable to the directions given in Reduction of Coins.

*TROY*

## TROY-WEIGHT.

| | ℔ | oz. | dwt. | gr. | |
|---|---|---|---|---|---|
| In | 426, | 06, | 13, | 12, | howmany Grains? |

*Anſw.* 2456964.

| | | | | |
|---|---|---|---|---|
| Pounds<br>Ounces<br>Penny-Wts. | multi-ply'd by | 12<br>20<br>24 | pro-duce | Ounce<br>Penny-Wts.<br>Grains |

*The contrary by Diviſion.*

In the 16th Example above, (becauſe it is a great Name to be brought into a leſſer) by 12, by 20, and by 24, agreeable to the Table of Quantity, taking in the odd Weight by the way, thus:

| ℔ | oz. | dwt. | gr. |
|---|---|---|---|
| 426, | 06, | 13, | 12. |

12

---

5118
20

---

102373
24

---

409494
204747

---

*Anſ.* 2456964 Grains.

Thus I think by this, and the foregoing Examples, I have fully ſhewn the Nature of *Reduction*; and its uſes will be more particularly found in the ſeveral Rules of Arithmetick hereafter, as in the *Rule of Three*, &c.

Here follow ſome Queſtions promiſcuouſly for the exerciſe of *Reduction.*

*Ex.* 17. In 988 broad Pieces, at 23 *s.* 6 *d.* how many Jacobus's at 25 *s.*?

*Anſw.* $928\frac{18}{25}$

*Ex.* 18. In 90 Guineas, and 9 Piſtols, the Guineas at 21 *s.* and the Piſtols at 17 *s.* how many Pence?

*Anſw.* 24516.

*Ex.* 19. In 20835499 Drams, how many Hundred Weight? *&c.*

| | C. | *qrs.* | ℔. | *oz.* | *dr.* |
|---|---|---|---|---|---|
| *Anſw.* | 726, | 2, | 20, | 10, | 11. |

| | ℔. | *oz.* | *dwt.* | *gr.* | |
|---|---|---|---|---|---|
| *Ex.* 20. In | 426, | 06, | 13, | 12. | how many Grains? |

*Anſw.* 2456964.

*Ex.* 21. In 246 Ingots of Silver, each 4 ℔. and half, how many Ounces?

*Anſw.* 13284.

*Ex.* 22. What Quantity of Gold will make 676 Funeral Rings, each to weigh 3 *dwt.* 12 *Grains*?

*Anſw.* 118 *Ounces*, 14 *Grains*?

*Ex.* 23. In 20105 Ells *Flemiſh* how many Ells *Engliſh*, and Yards?

*Anſw.* 12063 *Ells*, $15078\frac{3}{4}$ *Yards*

*Ex.* 24. In 19 Packs of Cloth, each Pack qt. 27 Pieces, and each Piece 25 Yards and a half, how many Ells *Engliſh*?

*Anſw.* $10465\frac{1}{2}$.

*Ex.* 28. In 420 Hogſheads, and 32 Gallons of Beer, how many Pints, if 54 Gallons make a Hogſhead?

*Ex.* 29. In 215403 Pints of Wheat, how many Quarters, *&c.*

*Ex.*

*qr. b. p. g. qt.*
*Anſw.* 420, 5, 2, 1, 1,

*Ex.* 30. In 524 Laſts Rape-ſeed, how many Buſhels?

*Anſw.* 41920.

*Ex.* 31. In 246 Years, how many Months, Weeks and Days?

*Anſw.* 3198 Months, 12792 Weeks, 89790 Days, or 86790 Days, at 365 Days in the Year

## *Of* TARE, TRET, *&c.*

*Groſs* is the Weight of the Commodity with the Hogſhead, Cask, Cheſt, Bag, Bale, Wrapper, or whatever elſe contains it.

*Tare*, is an allowance for the weight of the Hogſhead, Cask, Cheſt, &. or whatever elſe contains the Goods, Sometimes the *Tare* is at ſo much *per* C. Weight, as 14, 16, 18, or 24 lb. *per* Hundred, at other times at ſo much *per* Bag, Bale, Cheſt &c.

*Tret* is an Allowance of 4 lb. per 104, to Freemen of *London*, for Waſte, Duſt &c. on ſome ſorts of Goods, as Tobacco, &c.

*Clough*, or Draught is an Allowance of 2 lb. upon every Draught above 3 C. Weight. *Net* Wt, is what remains, when all the Allowances are deducted.

### *Examples.*

*Ex.* In 54 Bags of Hops, containing Groſs 135 *C.* 2 *qrs.* 14 lb. *Tare* 14 *p.* Bag, how many Hundreds Net?

*Anſw.* 128 C. 3 *qrs.* 14 lb.

Multiply the 54 Bags by 14, and the Product is 756 for the Pounds Tare, which divided by 112

the

gives 6 *C.* 3 quarters, for the Tare Weight which being Subtracted from 135 *C.* 2 *qrs.* 14 ℔. the Groſs Weight leaves 128 *C.* 3 *qrs.* 14 ℔. Neat.

*Ex.* 2. In 25 casks of Brimſtone, Weighing 46 Hundred, 3 quarters 12 pounds Groſs, Tare 8 ℔ *per* Hundred how many Hundred Neat?

*Anſw* 43 *C.* 2 *qrs.* 2 ℔.

In this Example multiply the 46 *C.* by 8, and it gives 368, to which add 6 pounds for the three quarters, and it makes 374, which divide by 112, as beſore, and then ſubtract the Tare from the Groſs

| | | | |
|---|---|---|---|
| 46, | 3, | 12 | Groſs |
| 3, | 1. | 10 | Tare |
| 43, | 2, | 2 | Neat. |

*Ex.* 3. In 9 Fats of Copper, cont. Groſs 75 C 1 *qr.* 24 ℔. Tare 8 pounds per Hundred, how many pounds Neat?

*Anſw.* 7849.

Multiply 75 C. by 8, *&c.*

*Ex.* 4. In 131 C. 3 *qrs.* of Figs, Tare 12 ℔ per hundred, howmany Hundred Weight?

*Anſw.* 117, 2, 15.

Multiply 131 by 12, and add 9 pound for the 3 quarters, *&c.*

*Ex.* 5. In 9 Casks of *Argol*, qt. Gr. 81 *C.* 1 *qr.* 17 Pound, Tare 14 Pounds *per Cent.* how many *C.* Net? *Anſw. C,* 71 0, 26

Multiply by 14, &c.

*Ex.* 6 In 25 Frails of Raiſins, each 1 *C.* $\frac{1}{4}$, Tare 4 Pound *p.* Frail how many Hundred Net? *Anſw.* 30 C. 1 *qr.* 12 Pound.

*Ex.* 7. In 42 Bags of Pepper, qt. Gr. 136 C. 2 *qr* 24 Pounds, Tare 5 ℔ *per* Bag and Tret 4 *l.* *per* 104 *lb.* howmany Pounds Net?

*Anſw.* 14521 ℔ and a half.

*Ex.* 8. In 6 Hogſheads of Tobacco qt. Gr. 42 C 3 *qr.* 12, Tare 602 ℔. and Tret 4 ℔. *per.* 104 ℔ how many Pounds Net? *Anſw.* 4037 Pounds.

In theſe two laſt Examples the Groſs Weight muſt be reduc'd into Pounds, and then the Pounds Tare deducted from the Pounds Groſs; the remaining Pounds you muſt divide by 26; becauſe 4 times 26 makes 104, and the Quotient are Pounds Trett, which you muſt ſubtract from the Pounds reſt, and the remainder are Pounds Net, as in the following Examples

| | |
|---|---|
| | 42, 3, 12 |
| | 4 |
| 26)4198(161 | 171 |
| 26 | 28 |
| 159 | 1370 |
| 156 | 343 |
| 38 | 4800 Pounds Groſs |
| 26 | 602 Pounds Tare. |
| (12) | 4198 |
| | 161 Pounds Trett |

*Anſwer* 4037 Pounds Nett

If the Tare be 14 *lb*, *p. Ct.* take one 8th of the Groſs Wt. for the Tare, and ſubtract &*c.*

If the Tare be 16 *lb. p. C.* take one Seventh of the Groſs Weight for the Tare &*c.*

If the Tare be 20 *lb. p. C.* take firſt for 16, and for the 4 *lb.* take one Fourth of that Quotient and add 'em together.

*Ex.* 9. In 426 Barrels of Anchovies, each 29 *lb.* and a half, Tare 7 *lb. p.* Barrel, how many Pounds Nett? *Anſw.* 9585.

*Ex.* 10. In 4 barrels of Rice, cont. 15 C. 2 *Qrs.* 16 *lb.* Gr. Tare 120 *lb.* Tret, 4 *p.* 104 *lb* and Clough 2 *lb. p.* Barrel, how many Pounds Nett?

*Anſ.* 1562.

*Ex.* 11. In 14 Barrels of Capers, qt 27 C. and a half 19*lb.* Tare 35 *per* Barrel, how many Pounds Nett? *Anſw.* 2609.

*Ex.* 12 In 24 Barrels of Nutmegs, cont. Groſs 89 C. 3 *qrs.* 27, Tare 658 Pounds, and Trett 4 *lb. p. C.* 104. how many Pounds Nett?

*Anſw.* 9020 *lb.* $\frac{1}{2}$

*Note,* By making 14 and 16 your ſtanding Rules as above, they being Aliquot Parts, of 112 *lb.* you find the Tare at any Rate *p. Cent.*

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# CHAP. VII.

## *The* GOLDEN RULE, *or, Rule of Three*

THIS *Rule* is ſo called, becauſe therein are *three* Numbers given to find a *fourth* unknown, which ſhall bear ſuch a Proportion to the *third*, as the *ſecond* to the *firſt* from whence alſo it is named, *The Rule of Proportion*, and for its excellent Uſe in *Arithmetick*, deſerves a *Golden Name*

The chiefeſt Difficulty ariſing is, the right ſtating, or due placing the three given Numbers for working, which may be eaſily done by obſerving.

1. That of the 3 given Numbers 2 of 'em are always of one denomination or name *viz.* both Money both Weight, Time, or both Meaſure *&c.* and the other Number of a different Name, muſt always ſtand in the middle, and is always of the ſame Name with the Anſwer required, and unto one of the two Numbers of like Name, the Queſtion is annexed, which muſt be the third Number in the

ſtating; and then it cannot be difficult to know which muſt be the firſt becauſe 1ſt and 3d. Numbers muſt be of like Name, or ſo reduc'd ; that is, if the firſt be Yards, ſo muſt the third ; or if the firſt be Gallons, Feet, Inches, Farthings, Shillings, or Ells, ſo muſt the third. —

2. In the next place, when your Queſtion is ſtated you are to multiply the ſecond Number by third, or the third by the ſecond ( it being all one in conſequence) and divide the Product by the firſt Number and the Quotient will be the fourth Number ſought, or Anſwer to the Queſtion, and is ever of the ſame Name you left the middle Number in ; which if in a low Denomination, muſt be brought higher, to the more ready comprehenſion of the Mind.

3. Sometimes it happens, that although the firſt and third Numbers are both of one Kind, that is both Money, Weight, or Meaſure, *&c:* yet they may not be one Denomination ; or, peradventure,they may conſiſt of ſeveral Denominations, in which Caſe you muſt reduce both to one Name, as was ſaid above,and if the middle Number conſiſts of more then one Denomination,it muſt be brought to the loweſt mentioned ; or lower, if you pleaſe.

4. When your Queſtion is ſtated, conſider with your ſelf whether the 3d. Number requires more or leſs than the ſecond; if more, then the leſſer of the two Extreams muſt be your Diviſor ; but if leſs, then the greater of the two Extreams is your Diviſor ; The firſt and third Numbers are call'd Extreams, with reſpect to the ſecond, or middle Number.

| | | | | |
|---|---|---|---|---|
| When | more | is requi- | leſſer | Extream is |
| | leſs | red, the | greater | Diviſor |

Thus by theſe two Words, *more*, or *leſs*, the Learner may diſtinguiſh when the Queſtion pertains to the *Rule of Three direct*, and when to the *Rule reverſe*.

5. When the firſt Number is the Diviſor, the Proportion is call'd *Direct*; but when the third Number is the Diviſor it's call'd *Inverſe* or *Reverſe*.

Having premiſ'd theſe things, I ſhall exemplify the Rule by the Examples following, *viz*

*Ex.* 1. If 5 Gallons of Brandy coſt 22 *s.* 6 *d.* what will 134 Gallons coſt?

22 *s.* 6 *d.*

12

270

134

1080

810

270

5)36180

12)7236

2,0 60,3

*L.* 30, 3. *Anſw.* *L.* 30, 3*s.*

This queſtion is propos'd and lies ready ſtated to hand, for the Demand is on 134 gallons and is the 3d Number, according to the firſt Note of Direction foregoing; and that of the ſame Name, *viz.* 5 Gallons, is the firſt agreeable alſo to the ſaid

Note; and the middle is Money, to wit, 22s 6d. and of the ſame Name with the fourth Number ſought: For the Queſtion is, What Money will 134 Gallons coſt?

Firſt, I reduce the middle Number (becauſe of more Denominations than one, *viz.* Shillings and Pence) into one Denomination, to wit, Pence, according to the latter-part of the 3*d.* Note, and they make 270 Pence which I multiply by the 3*d.* Number, 134, and the Product makes 36180; which, (according to the ſecond Note of Direction) I, divide by the firſt Number 5, and the Quotient is, 7236 which are Pence, and of the ſame Name that the middle Number 22*s.* 6*d.* was reduce'd to; which being divided firſt by 12, and then that Quotient by 20. gives, or quotes, 30 *l.* 3*s.* for the Anſwer, as in the Work.

*Ex* 2. If 15 Yards Silk coſt 48 *s.* what will 245 Yards coſt?

245 Yards
48
——
1960
980
——
15)11760(78, 4.
105 . . ——
——39 *l.* 4 *s.* *Anſwer*
126
120
——
60
60
——
(0)

In this Example, the Queſtion alſo ſtands truly ſtated, according to Rule, wherefore I only multiply the 3d Number by the 2d, the Product of which I divide by the firſt Number 15, and the Quotient, is 784 Shillings, and is of the ſame Name with the middle Number, to wit, Shillings. 48 which Shillings divided by 20, according to the Rule in *Reduction*, gives 39 *l.* 4 *s.* as the above Example plainly makes out.

*Yds* *s.* *yds*
*Ex.* 3 If 245 of Silk coſt 784 what will 15 coſt ?

784 s. 245)11760)48 *s. Anſw.*
15 980
3920 1960
784 1960
11760 (0)

Here, in this Example, I multiply the 2d Num- by the 3d. that the leſſer Number may ſtand undermoſt, and to avoid having ſo many Products, and then divide by the firſt according to Rule and the Quotient is 48 s. for the Anſwer, and is a Proof to the 2d Example.

*Ex.* 4 If 1 C. Weight of Dates coſt 4 l. 5 s. 2d what will 34 C. 3 qrs. 18 l. coſt at that rate ?

Here the 3d. Number has Pounds mention'd in it, wherefore 34 C. 3 qrs 18 l. muſt be brought into Pounds and the middle Number into the loweſt Name mentioned according to the 3d Note and likewiſe the 1ſt Number muſt be ſet in Pounds becauſe the third will be Pounds; and ſtands ſtated thus.

℔. *l. s. d.* C. *q. lb.*
If 112—4, 5, 2 —— 34, 3, 18
20 4
85 139
12 28
1022 1120
279
3910
1022
7820
7820
39100
(12
112) 3996020(35678 Pence because the middle No is ſo.
336····
2,0)297,3·2
636
560 *Anſ.* 148, 13, 2 $\frac{84}{112}$
760
672
882
784
980
896
(84)

After reducing the 2d and 3d Numbers, the 3d is multiply'd by the ſecond, and that Product divided by the 1ſt, and the Quotient is Pence, which divi-

9 9

divided by 12, and by 20, gives *l.* 148 13, $\frac{114}{82}$ for the Anſwer, as in the Operation may be ſeen.

*Ex.* 5. If 1 Gallon of Oyl coſt 9 *s.* 6 *d.* $\frac{1}{2}$, what will 376 Gallons coſt?

12

114
4

458
376

2748
3206
1374

4)172208

12)43052

2,0)358,7 -- 8 *d.*

*L* 179, 7 8. *d*

In this Example I cannot divide by my 1ſt number, according to the Rule, becauſe 1 neither divides, or multiplies, but I conſider what Name the middle Number is reduc'd to, which here is Farthings, which I multiply by the 3d Number, and the Product is Farthings, which divided by 4 and that Quotient by 12, and the next by 20, gives *l.* 179, 7, 8. for the Anſwer, as in the Work —— After this rate, are all Queſtions work'd, and the Anſwer found when the firſt Number is a Unit, and the 3d. Number of the ſame Name.

Queſtions wrought by the Inverſe Proportion, are ſuch as theſe that follow

Ex. 7. If 4 Men dig a Trench in 3 days, in what time will ſix Men do it? Anſw. in 2 days.

M. D. M.
If 4 —— 3 —— 6
3
——
6)12
Anſwer 2 days
——

Here the more Hands, the leſs the Time requir'd, wherefore the greater extream is the Diviſor, which being the 3d Number, the Proportion is Inverſe according to the 5th Note.

Ex. 8. If 60 yards of Serge of 3 Quarters wide will Line a certain Number of Coats how many Yds will Line the ſaid Coats, when the Serge is but half Yard wide? Anſ. 90 Yards.

qr. W. Yds. qr. W.
If 3 —— 60 —— 2
3
——
2)180
——
Yards 90 Anſ.
——

Here the Stuff being narrower, more Yards are requir'd, wherefore the leſſer Extream is Diviſor.

Ex. If 100 l. principal in 12 Months gain 5 l. Intereſt, what Principal will gain as much in five Months? Anſ. 240 l.

Mo. *l.* Pr Mo.
If 12 —— 100 —— 5
12
——
5)1200
——
240 l. Anſwer.
——

Here the Principal muſt be more, becauſe the time is leſs, wherefore the leſſer Extream is Diviſor: And as in the foregoing Queſtions, I multiply 1ſt and 2d Numbers together, &c.

Ex. 10. If a Half peck Loaf weigh 9 ℔. when Wheat is 5 *s.* a Buſhel, what muſt it weigh when Wheat is 3 s a Buſhel? Anſw. 15 ℔.

s. ℔ s.
If 5 —— 9 —— 3
5
3)45
15 ℔ Anſwer

Here the Weight muſt be more, becauſe the Price is leſs.

Ex. 11. If I lend a Friend 75 *l.* for 6 Months on promiſe of doing me the like *Kindneſs*, but at my Need he can lend me but 50 *l.* how long may I keep the ſame as a ſufficient Recompence? Anſwer. 9 Months.

*l.* Mo. *l.*
If 75 —— 6 —— 50
6
5,0) 45,0
9 Months Anſwer.

Ex. 12, If a Carrier receives 4 *l.* 4 *s.* for the Carriage of 12 C. 120 Miles how many Miles muſt he carry 5 C. for the ſame Money? Anſwer, 288 Miles.

C. M. C.
If 12 —— 120 —— 5
12

5 ) 1440

Anſwer 288 Miles

In theſe Queſtions the thrid Term bears the ſame Proportion to the ſecond, as the firſt doth to the 4th.

### *Of Remainders.*

When any thing remains, after you have multiply'd your ſecond and third Numbers together, and divided by firſt, it is part of an Unit of the Quotient, the Value of which is thus found.--- Multiply the Remainder by the Part of the next inferior Denomination that are equal to one of the Quotient ſtill dividing by the ſame Diviſor, as if the Quotient be Pounds, then multiply the Remainder by 20, and divide by the firſt Diviſor and the Quotient will be Shillings; and then if any thing remain, multiply it by 12 and divide by the ſame Diviſor, and the Quotient will be Pence, and if any thing remain multiply by 4, *&c.*

### *Example*

If 9 C. of Sugar coſt 5 l. what will 16 C. coſt?

16
5
9|80
*l.* 8..
20
9|160
Shillings 17—7
12
9|84
Pence 9—3
4
4
9|12
$\frac{1}{4}$ $\frac{2}{9}$

By this Operation it appears, that if 9 Hundred of Sugar coſt 5 *l.* 16 Hundred will coſt 8 *l.* 17 *s.* 9*d.* Farthing.

Now follow various Queſtions for Practice and trial of the Learner's Ability.

Ex. 13. If 28 *lb.* of ſugar coſt 15*s.* 4d. what will 19 C. 3 qrs. 20 *lb.* at that rate?
Anſwer. *l.* 58, 04, 11$\frac{1}{4}$ $\frac{20}{28}$

Ex. 14. If a Quarter of Barley coſt 17 s 4. what will 24 Quarters 4 Buſhels and 3 Pecks, coſt at that rate?

*Anſw.* 21 *l.* 6, 3

Ex. 15. If a Hundred Weight of Hops coſt 10 Pound ten, I demand what will five Bags, each weighing two Hundred, one Quarter and 18 ℔.

*Anſwer*, *l.* 126, 11, 3.

Ex. 16 If 12 Yards, 3 quarters of Shalloon coſt nineteen Shillings, Ten Pence Half-Penny, what will 387 Yards coſt at that rate?

*Anſwer*, *l.* 30, 3. 3.

Ex. 17 If half a yard of Velvet coſt 16 Shillings and Four pence, what will 19 yards and a half coſt at that rate?

*Anſwer*, *l.* 31 17, 0.

Ex. 18. If one yard of Cloth be valued at two Shillings and Nine-pence, how many Ells of the ſame may be bought for 219 Pounds, ten Shillings?

*Anſwer*, 1276 $\frac{4}{5}$

Ex. 19 Admit A. owes B. 296 Pounds, 17 Shillings, and compounds to pay ſeven Shillings and Six-Pence in the Pound, the queſtion is, What muſt B. receive for his Debt?

*Anwſ.* *l.* 111, 6, 4, $\frac{1}{2}$.

Ex. 20 If B. owes C. 395 Pounds, eighteen Shillings and compounds the Debt for 98 Pounds nineteen Shilling, Six-pence, what doth he pay in the Pound?

*Anſwer*, Five Shillings.

Ex. 21 How many Yards is there in a peice of Cloth that coſt *l* 14, 12, 6, admitting the Yard to be valued at 7 *s.* 6 *d*?

*Anſwer* Thirty nine Yards.

Ex. 22. If I have fifty Pounds *per Annum*, how much is due to me for 144 Days, at that rate?

*Anſwer*, *l.* 19, 14, 6 $\frac{90}{365}$

Ex. 23. If one Hundred Pounds in twelve Months gain 5 Pounds Intereſt, what will two Hundred and ſeventy five Pounds, ten Shillings and Sixpence gain in the ſame time?

*Anſwer*, *l* 12, 15, 6 $\frac{1}{4}$ $\frac{1}{1}$.

Ex. 24. In what Time will 75 Pounds gain 25 Pounds Intereſt, after the rate of 5 *per Cent. per Annum*?

Anſwer, Eighty Months, or ſix Years and eight Months.

Ex. 25 What muſt I give for the Inſurance of, *l.* 426, 12, at 5 Guineas *p Cent.* the Guineas at 21 *s*? Anſwer, *l.* 22, 7, 11.

Ex. 26. If my Share in a Ship be $\frac{4}{32}$ Parts, what is due to me for Freight. if the whole Freight of the Voyage amounts to *l* 1266, 16?

*Anſwer*, *l.* 158, 07, 0,

Ex. 27 If a ſilver Tankard, weighing forty-ſix Ounces. fifteen Penny Weight 12 Grains, is bought at five Shillings and Four-pence *per* Ounce. what comes it to?

Anſwer, *l* 12, 9 5 $\frac{7}{12}$. or, $\frac{28}{48}$

Ex. 28. How many Hundred Weight of Sugar at 5 · $\frac{1}{2}$ *per* ℔. may I buy for 156 Pounds?

Anſwer, C. 60, 3, 3.

Ex. 29. What comes the Brokerage to of *l.* 419 17. at half *per* Cent.

Anwſer, *l.* 2, 11, $\frac{3}{4}$

Ex. 30. If I have an Eſtate of 500 *l. per* Ann. what may I expend daily, and yet lay by 12 *l.* 15 *s. per* Month?

Anſwer, Nineteen Shillings *per Diem*

Ex. 31 If I buy a Butt of Mountain-Wine, at twenty-eight Pound ten Shillings, and it chances to leak 12 Gallons valued at 4 *s.* 6 *d per* Gallon, what doth it ſtand me in a Gallon?

Anſwer, 4 *s.* 11 *d*, $\frac{2}{4}$ $\frac{20}{126}$, *The*

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## *The Proof of the RULE of THREE,*

THE *RULE* of *THREE* may be proved ſeveral Ways: As,

1ſt, By a contrary Stating and Operation. As if 12 Yards coſt 36 *s.* what 9 yards? Anſwer, 27 *s.* Then if 9 yards coſt 27 *s.* what 12 Yards? Anſwer 36 *s.* Or,

2dly, If you multiply the 4th. Number, or Anſwer by firſt, and the Product be equal to Product of the ſecond and third Numbers multiply'd together the Work is true, otherwiſe not. As here the Product of 36 multiply'd by 9 is 324 ſo is 27 the Anſwer, multiply'd by 12, the firſt Numbers which ſhews the Work to be right.

But to prove a Queſtion belonging to the *Inverſe Proportion*, you muſt compare the Product of the ſecond multiplyd by the firſt with the Product of third, multiply'd by the 4th, and they agree. the Work is right.

*Example*, If 6 Bricklayers build a Wall in 14 Days, in what Time will 8 do the ſame. Anſwer, In 10 Days and half.

$$\begin{array}{ccccc} & \text{B} & \text{D} & \text{B} & \\ \text{If} & 6 \text{———} & 14 & \text{———} \; 8 & \\ & & 6 & & \\ \hline & & 8|84 & & \end{array}$$

Days 10 $\frac{1}{8}$ equal to $\frac{1}{2}$

Here 14 multiply'd by 6, produces 84; ſo doth 10 multiply'd by 8, and taking in the remainder 4, produce the ſame

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# CHAP. X.

## RULES of PRACTICE.

BEfore I treat concerning the Rules of plural Proportion, viz. *The Double Rule of Three*, I ſhall ſpeak relating to thoſe excellently uſeful, and moſt conciſe Rules, call'd, *Rules* of *Practice*.

1. When any Queſtion in the Rule of Three Direct, hath a Unit, or, 1 in the firſt Place; that is, if the Queſtion ſays, If 1 Yard, Ell Pound, Gallon, &c. coſt ſo much what ſo many Yards Ells Pounds, Gallons, &c. ſuch Queſtion may be much ſooner done by ſome one of theſe Rules, which from their frequent Uſe among Tradeſmen and Merchants, are call'd Rules of Practice as above.

2. The Rules of Practice are either when the Price of the Integer (or thing) conſiſts of Farthings under 4; of Pence under 12; or of Shillings under 20.

It is neceſſary for the Learner before he proceed to have theſe ſhort and eaſy Tables by heart.

## *Aliquot* PARTS.

| *Of a Penny.* | | *Of a Shil.* | | *Of a Pound* | |
|---|---|---|---|---|---|
| | | d | | s. d | |
| 1 Farthing | $\frac{1}{4}$ | 6 | $\frac{1}{2}$ | 10,0 | $\frac{1}{2}$ |
| 2 Farthings | $\frac{1}{2}$ | 4 | $\frac{1}{3}$ | 6,8 | $\frac{1}{3}$ |
| 3 Farthings | $\frac{3}{4}$ | 3 | $\frac{1}{4}$ | 5,0 | $\frac{1}{4}$ |
| | | 2 | $\frac{1}{6}$ | 4,0 | $\frac{1}{5}$ |
| | | $1\frac{1}{2}$ | $\frac{1}{8}$ | 3,4 | $\frac{1}{6}$ |
| | | 1 | $\frac{1}{12}$ | 2,6 | $\frac{1}{8}$ |
| | | | | 2,0 | $\frac{1}{10}$ |
| | | | | 1,8 | $\frac{1}{12}$ |
| | | | | 1,0 | $\frac{1}{20}$ |

The meaning of the Word *Aliquot* is ſuch a Part of a Number as being taken certain times, doth preciſely make the Number; as 3 is an Aliquot Part of 12, 4 of 20, and 5 of 40 &c. that is, 3 is the 4th of 12, 4 is the 5th of 20; and 5 is the 8th of 40, &c.

# RULES of PRACTICE.

## I. Of Farthings under Four.

COnſider what Part of a *Penny* the Price is and divide the Number of *Integers* by that Part; whether by 4, by 2, or by 8, and the *Quotient* is *Pence.* which divide by 12, &c. by 20, *&c* as in the Examples following.

| | | |
|---|---|---|
| 1*d* | *d* | *Ells* |
| | $\frac{1}{4}$ | 549 of *Holl.* Tape |
| | | —— at $\frac{1}{4}$ *d*, *p.* Ell. |
| | $\frac{1}{12}$ | 1173—2 |
| 1*s.* | 1*s* | |
| | $\frac{1}{20}$ | 97—9 |
| | 1*l.* | |
| | | *l.* 4, 17, 9 $\frac{1}{2}$ *Anſ* |

*In this Example I divide, or take the 4th part of 4694 and the Quot. 1173 is Pence, and 2 remains, which are 2 Farthings; for note once for all, Whatever remains, is ſtill of the ſame Name with the Dividend as 4694 are Farthings that is Ells at 1 Farthing apiece, wherefore the 2 that remnins are 2 Farthings, or* $\frac{1}{2}$*d. then I take the 12th part of 1173 & it quotes 97, which are 97 Shillings, and 9 remains which is 9 d. (becauſe 1173, the Dividend are Pence) Laſtly I take the 20th part of 97, or (according to the Rule in Reduction of bringing Shillings into Pounds I ſeperate the laſt Figure to the right hand*

hand being 7, and halve 9, ſaying the half of 9 is 4, which is 4 Pounds; ſo that the Anſwer is 4 l. 17 s. 9d. ½ as may be ſeen in the Work. If I had taken the 12th part of 4694. the Quotient would have been Three pences, which divide by 4. quote Shillings &c.

Yds.
d
½d ½ 1 4790 of Incle at ½
per Yd.
2395
1d ½ 2
19 9. 7.
1s. ½ 0
l. 9, 19, 7. Anſwer

Here I ſay the half of 4, is 2, and the half of 7 is 3, and the half of 19 is 9 and the half of 10 is 5; which thus dividing by 2, quotes 2395 Pence, which I bring into Pounds as in the firſt Example.

Or if I had taken the 8th part of 4790 the Quotient would have been 398 Grts. and 6 remaining, or Half pence, equal to 3d then thoſe Groats divided by 3, would quote 199 Shillings, and one Groat, remaining, which 4d. and 3d. make 7d. equal in Anſwer to the other Work.

℔.
¾ d ⅛ 6 8888 of Sea-Bread,
at ¾ per ℔.
6d ½ 1111
55 5—6d.
½
l. 27, 15, 6 Anſw.

In this Example I take the 8th part of the given Number, becauſe 3 Farthings is the 8th part of 6d. and the Quotient is Six-pences, &c.

d Gallons.
¼ ¼ 796 at ¼ p: Gallon.
d 1 ½ 199
1s.
s. 16--7 Anſ. 16s, 7

Pound

*Pounds.*
d 4680 at ½ p. lb.
½ ⅙ 3
3*d* ¼ s 780
1/20 19,5
*l.* 9,15 Anſwer.

## II. *Of Pence, under* 12.

Take ſuch Parts of the given Number as they repreſent of a Shilling, and the Quotient will be Shillings; which bring into Pounds as before.

lb.
1*d* 1/12 5728 Suffolk Cheeſe at 1 d. p. lb
1s. 1/20 477—4 *d.*
*l* 23, 17, 4 Anſwer.

s. lb.
2*d* ⅙ 1 7260 of Salt at 2d. p. lb.
1s 1/20 121,0
*l.* 60, 10 Anſ.

3*d* ¼ oz.
497 of Worſted at 3*d.* p. oz.
1s. 1/20 12,4, 3 *d.*
*l.* 6, 4, 3 Anſw.

*Yds.*
4*d* ⅓ 8934 of Ribbon at 4*d.* a Yd.
1s. 1/20 2978
*l.* 148, 18 Anſw.

lb.
3*d* ¼ 1 4569 of Candles at 5*d*, a Pound
2 1142—3d.
5 761—6
1903, 9
*l* 95,3, 9 Anſ.

In this Example I take firſt for 3d, and then for 2d. which make five-pence; wherefore I add the 2 Quotients together. The ſame Anſwer would have been, if I had taken firſt for 4*d* and then for 1*d*. After the ſame Method may Examples be done if the Price be 7 *d*. 9 *d*. or 10*d*. for 3 *d*. and 4*d*. make 7 *d*; 6*d*. and 4*d*. 10*d*.

s. ℔.
6*d* $\frac{1}{2}$ 1 4719 of Sugar at 6*d*.

2359—6

*l* 117—19—6 Anſ.

℔.
4*d* $\frac{1}{3}$ 1 2383 of Bacon, at 7d.
3*d* $\frac{1}{4}$ 794·—4d.
595—9
7
$\frac{1}{20}$ 139, 0, 1

*l* 69,10 [illegible] Anſwer

℔.
4*d* $\frac{1}{3}$ 46920 of Tobacco at 8d. p. ℔.
4 $\frac{1}{3}$ 15640
15640
8
1s. $\frac{1}{20}$ 3128,0

*l* 1564 Anſwer

℔
6*d* $\frac{1}{2}$ 429 Loaf-Sugar at 9 d. p. ℔
3 d.
9 $\frac{1}{2}$ 6 214 6
107, 3
1s. $\frac{1}{20}$ 32,1,9

*l* 16,1,9 Anſwer

℔
6*d* $\frac{1}{2}$ 3790 of Tobacco at 10 *d*.
4 $\frac{1}{3}$ 1895
10 1263—4d.
1s. $\frac{1}{20}$ 315, 8, 4

*l* 157, 18, 4 Anſwer

Yds.
845 Coventry Stuffs
at 11d. p. Yd.

6d s. 1/2 422, 6
4 1/3 281, 8
1 70, 5
11 1/20 1/2 77,4,7

l38,14,7 Anſwer

## III. *Of Shillings under* 20.

TAke ſuch Parts of the given Number, as the given Price in Shillings repreſent of a Pound, and the Quotient will be Pounds, &c.

— Note, That when the Price is 2s. only double the laſt Figure toward the Right-Hand for Shillings, and the other Figures to the Left are Pounds: As 246 Gallons at 2 s p G. is l24, 12. 67 Ells at 2s. is l·6 14 and 972 Yards at 2s. is l· 97. 4, &c.

lb
7460 of Indico at 4s. p. lb
4s 1/5 1492 l. Anſwer

7967 G. of Brandy at 5 s p. Gal.
5 1/4 1991, 15 Anſwer.

4200 Gal, at 6s. p Gal.
4 1/5 840
2 1/2 4 420

l.1260 Anſwer

796 Yards at 8s. a Yd
4 1/5 153, 16
4 1/5 153, 16

l307, 12 Anſwer

Ells
796 at 9 s. per. Ell
5 1/4 199
4 1/5 159 4 s.

338 4 Anſwer.

Or, if the Number of Integers are multiply'd by the *Shillings* in the Price and then halv'd to bring the Shillings into Pounds, it anſwers to the ſame Intent, as by taking Parts as above; and very ready for Diſpatch.

Example.

lb.
796 at 9 *s.* per lb.
9

716,4

$\frac{1}{2}$0 *l* 358,4 Anſwer as above

## IV. *Of Pence & Farthings, and of Shillings, Pence, & Farthings.*

1 *s.*
1 *d* $\frac{1}{12}$ 4264 Tallow lb at
$\frac{1}{4}$ $\frac{1}{4}$ 1 *d.* $\frac{4}{1}$ p.
1 *d* 355, 4
88, 10

$\frac{1}{2}$0 44, 4 2

*l* 22, 4, 2 Anſwer.

IN this Example I take $\frac{1}{12}$ of the given Number for the Penny, which quoteth 355*s.* and 4*d.* remains; then I conſider that $\frac{1}{4}$ is $\frac{1}{4}$ of a Penny wherefore I take $\frac{1}{4}$ of 355*s.* 4 *d.* (and not of the given Number 4264) and it quotes 88*s.* 10 *d.* Thus I ſay, the 4's in 35 ? 8 times; and the 4's in 35? 8 times, and there remains 3s. which is 36 d. and 4 d. taken in, makes 40 d then the 4's in 40? 10 times; which 2 Lines added together, make 444 *s.* 2 d. or 22 l. 4 s. 2 d. as in the work. And so of any other of this kind.

℔
1 *d* ½ 2 4269 at 1 d. ¾ per l.

½ *d* 1 *d* 355—9 d.
177, 10½
½ ½ 88, 11 ¾
¼
62, 2, 7 ¼
½ 0
l. 31, 2, 7 ½ Anſwer

After I have taken 1/12 of 4269 for the Penny, I take the ½ of that Quotient for the Half penny; and then the ½ of that Line for the Farthing &c.

s. ℔
2 *d* ⅙ 1900 Cheeſe 2 d. ½ *per l.*

*d*
½ *d* ¼ 2 819—8 d.
204, 2
½ 0 102, 0, 10
l. 51, 00, 10 Anſw.

s. ℔
3 *d* ¼ 1 579 *dit.* at 3 d. ¼ *per* l.

*d*
¼ 1/12 3 144, 9
12, 0 ¼
156, 9 ¾
½ 0 l. 7, 6, 9 ¾ Anſw.

½ 7093 ℔ Sug. at 7 *d.* ¾
6 *d*
*d*
1 *d* ⅙ 6 3546, 6
591, 1
¾ ⅛ 6 444, 3, ¾
458, 0, 10, ¾
½ 0
l. 229, 00, 10 ¾ Anſ

Three Farthings is ⅛ of 6 d. wherefore I take ⅛ of the 6 *d.* Line 3546, 6 saying the 8's in 35? 4 tim the 8' in 34? 4 *tim* 8's in 26? 3 *tim* and there remains 2 s. or 24 d and 6 is 30, the 8's in

30 ? 3 times; and there remains 6, or 24 Farthings, and the 8's in 24 ? 3 times &c.

lb.
757 of Tobacco at 9 d. ½
6d ½ d. 378, 6
3d ½ d. 189, 3.
½ ⅙ 3 31, 6 ½
1|0 59, 9, 3 ½
l. 29, 19, 3 ½ Anſ

lb
3579 at 11 d ¾ per l
6d ½ d. 1789, 6
3 ½ 6 894, 9
2 ⅓ 6 596, 6
¾ ¼ 3 223 8 ¼
350, 4, 5 ¼
l. 175, 4, 5 ¼ Anſw

## V. Of Shillings, Pence, and Farthings.

Multiply by the Shillings, & take Parts for the Pence & Farthings

Ells
976 of Holland, at
s.
2 2|3 ½
3d s. ¼ 1 1952
d 244
½ ⅙ 3 40, 8d.
223 6, 8
l. 111, 16, 8 Anſw

Yards
2728 of Muſlin at
5 5s 9d. ¾
13640
6d ½ d. 1364
3 ½ 682
¾ d ¼ 3 170, 6
½
1585, 6, 6
l. 792, 16, 6 Anſw

Gallons
978 of Brandy at
7 7*s.* 8*d* $\frac{1}{2}$ p.G.

4*d* $\frac{1}{3}$ 6846
4 $\frac{1}{3}$ 326
$\frac{1}{2}$ $\frac{1}{8}$ 4*d* 40, 9

753, 8, 9

$\frac{1}{2}$0 l. 376, 18, 9 Anſ.

Yards
749 of fine-cloth at
16 16 s 6d $\frac{1}{2}$ p.Y

4494
749
6*d* 374, 6
$\frac{1}{2}$ $\frac{1}{2}$ *d* 31 2 $\frac{1}{2}$
$\frac{1}{1}\frac{}{2}$6
1238 9 8 $\frac{1}{2}$

$\frac{1}{2}$0 .619, 9, 8 $\frac{1}{2}$ Anſ.

## VI *Of the even Parts of a Pound.*

Conſider what *part of a* Pound the Price is and divide the given Number of Integers by it and the quotient will be Pounds

*s.d* Gallons
68 $\frac{1}{2}$ l 9752 of Brandy at
6*s.* 8*d.* p. G.
l. 3250, 13, 4 Anſ.

I take $\frac{1}{3}$ of 9752 and there remains 2, which is 2 ſix & eight *pences* or 13/4 ſo the Anſwer is, l. 3250, 13, 4

lb
5 $\frac{1}{2}$ l. 7261 of Indico at
5 s per l.
l, 1815—5 Anſw.

Ells
4*s.* $\frac{1}{5}$ l 4720 of Holland at
4 s per E.
l. 944 Anſwer.

*s.d* lb
34 $\frac{1}{6}$ l 9720 of Cloves at
3/4 p. lb
l. 1620 Anſwer.

s d | Yards
26 | $\frac{1}{8}$ l. | 719 of Silk at 2|6

l. 89, 17, 6 Anſw.

---

Gallons
s d
18 | $\frac{1}{12}$ | 47690 of Oyl at 20d per Gall.

l. 3974 — 3, 4 Anſ.

## VII. *When the Price is Shillings & Pence and no even Part of a Pound*

Multiply the given Quantity by the Shillings in the Price, and take Parts for the Reſt. Or ſometimes the Price may be divided into even Parts and work'd that way; as 12|6 is 10 s and 2|6 15| is 10 s. and 5 | &c.

Ells
579 of Holland at
3 3 s. 2d. p Ell.

1737
2d $\frac{1}{6}$ 1s. 96—6

183, 3, 6

l. 91, 13, 6 Anſwer

---

76395 Indico at 4s
4 5d p. ℔

s. 305580
3d $\frac{1}{4}$ 19098—9d
2 $\frac{1}{6}$ 12732—6

$\frac{1}{20}$ 33741, 1, 3
l. 16870, 11, 3 An.

---

℔
6942 at 9, 6
9

s. 62478
6d $\frac{1}{2}$ 3471

$\frac{1}{20}$ 6594, 9

3297 9 0 Anſwer.

Quarters
976 of Oats at 9|9
9
---
6d 8784
3 ½ 1s. 488
½ 6d 244

½ 0 951,6

475, 16, 0 Answer.

lb.
798 of Scamony
18 at 18s. 6d.

6384
798
6d ½ 1s. 399

½ 0 476, 3

738, 3, 0 Answer.

The Price divided into Parts.

Gallons.
5s. ¼ l. 205 of Tent 7/6 s. p. Gall.
s.d
2,6 ⅛ 51—5
25—12, 6
7,6 76, 17, 6 Anf.

5s ¼ l.
s. d
3. 4 ⅙
8, 4

10 s ½ l.
2 6 ¼ 10s

4s ⅕
6d ⅛ 4s.

10 s ½
5 ½ 10s
2, 6 ½ 5s
17, 6

Gallons.
1515 of Brandy at 8|4
378—15
252—10

l. 631—5 Anfw.

lb.
7496 of Tea at 12|5 p lb
3748
937

l. 4685 Anfwer.

*French* Crowns
4796 at 4|6
959—4s.
119—18

1079, 2 Anfw

C.
978 of Sugar at 17s. 6d.
489
244—10
22—5

855, 15 Anfw

VIII. *If the Price be any Number of Pounds, Shillings, Pence; reduce the Pounds and Shillings into Shillings, and multiply the Quantity by the Shillings. & take Part for the Pence, as before.*

C.
246 of Hops at l. 3
67 7s. 6d. per C

1722
s 476
6d ½ 1 12, 3

1660, 5
l. 830 5, 0 Anſw.

C.
537 of Almonds a
135 l. 6, 15, 4 p C

2685
1611
537
s 179
4d ⅓ 1

7267, 4

3633, 14, 0. Anſw

Pieces of Silk
75 at l. 8. 12 s. 3d.
172

860
s 1204
3d ¼ 1 18, 9

1291, 8

645, 18, 9 Anſwer

Here 572 is multiply'd by 75

IX. *When the Price is above 1 Shilling, & under 2 Shillings, then let the given quantity ſtand as* *as Shillings and withou drawing a Line, take Parts for the Pence, or Pence and Farthings, &c add the ſeveral Lines together &c.*

Ells

d 1½ | ⅛ | 1 | 1279 of Dowlaſs at
13d ½ per Yard.

d
159,--1. ½

½ | 0 | 143,8,10⅓

lere 1279 ls are ſhillings 1 p cce of b c 1 ake ⅛

71. 18, 10 ½ Anſ

4 | ⅓ | 1 | 3762 Gallons of Spirits at 10 d p Gall
1254
5016
l. 250, 16 Anſwer

Yards
6d | ½ | 1 | 4796 at 18d p. Yd
½ | 0 | 2398
7194
l 4, 0 Anſ.

Yards
97069 of Serge at
21d ½ per Yard

s
6d | ½ | 1 | 48534, 6
3 | ½ | 6 | 24267, 3
½ | ⅙ | 3 | 4044, 6½

17391, 5, 3 ½

l. 8695, 15, 3 ½ An.

## X. *If the given quantity hath odd Weight or Meaſure an next to it.*

Work for the whole number as before and for odd Weight or Meaſure, take parts of the given Price accordingly; as for ¼ take a quarter of the Price, and add it to the other work for ½ the Half, and for ¾ three Quarters of the Price, &c.

C.
256 $\frac{1}{2}$ of Rice at
15 15/6 p C

280
256
128 the half of
6d $\frac{1}{2}$ 7, 9 15 s 6 d

3975, 9

l. 198, 15, 9 Anſw.

65 Qrs. 5 Buſh. of
32 Wheat at
3s 6 d. Q.
130 B
195 4 $\frac{1}{2}$ B 16 3
6d $\frac{1}{2}$ 0 32, 6 1 $\frac{1}{4}$ 4/4, 0 $\frac{3}{4}$
for the 20, 3 $\frac{3}{4}$
5 Buſh 20, 3 $\frac{3}{4}$
213, 9, 9 $\frac{3}{4}$

l 106 12, 9 $\frac{3}{4}$ Anſw

C qrs. lb
426, 2, 14 of Tar
33 (at l. 1, 13

1278 qt $\frac{1}{2}$ 16 6
1278 lb 14 $\frac{1}{4}$ 4, 1 $\frac{1}{2}$
20 7 $\frac{1}{2}$
20, 7 $\frac{1}{2}$
1407, 8, 7 $\frac{1}{2}$

l 703, 18 7 $\frac{1}{2}$ Anſ.

Tuns qr. lb Iron
16, 12 3, 16
15 (at l 15,10,0

s. l
230 10 C $\frac{1}{2}$ 7 15,0
46 2 $\frac{1}{5}$ 1 11, 0
23
I $\frac{3}{2}$ 1 9, 19,10 C $\frac{1}{2}$ $\frac{1}{4}$ 7, 9
C $\frac{1}{4}$ 3 10 $\frac{1}{2}$
l. 722, 13 10 14 l $\frac{1}{2}$ 10 $\frac{1}{4}$
2 lb $\frac{1}{7}$ 3 $\frac{1}{4}$

Gallons
976, 3 qrs of Brandy
5 (at 5 s 7 d p G

s 4880
$\frac{1}{2}$ 488 $\frac{1}{2}$ 2, 9 $\frac{2}{8}$
d 81 4 $\frac{1}{5}$ 1, 4 $\frac{3}{4}$
6d $\frac{1}{6}$ 6 4 2 $\frac{1}{4}$
4, 2 $\frac{1}{2}$
1 $\frac{1}{2}$ 545 3 6, $\frac{1}{2}$

l 272 13 6 $\frac{1}{2}$ Anſw

RULES

## RVLES of PRACTICE by MVLTIPLICATION,

THERE is a moſt conciſe Way of caſting up the ſeveral Articles of Bills of Parcels, &c. by Multiplication *viz.* by multiplying the Price by the Quantity, carrying from one Denomination to another, as in Addition of Money.

*Ex.* Seven Yards of Cloth at 5|9 *per.* Yard
7

*l.* 2, 00, 3 Anſwer

Here I ſay, 7 times 9 is 63 *d.* 3, and carry 5 *s.* and 7 times 5 is 35, and 5 is 40*s.* or 2*l.* ſo the Anſwer is 2*l.* 0, 3*d.* as in the Work.

9 C of Hops, at *l*, 3, 05, 6 *per* C.
9

*l.*29, 9, 6 Anſw

In this Example I ſay, 9 times 6*d* is 54 *d.* or 4 *s.* 6 *d.* I ſet down 6 and carry 4 and 9 times 5 is 45, and 4 is 49, I ſet down 9*s.* and carry 2*l.* then 9 times 3 is 37, and 2 is 29, ſo the Anſwer is 29*l.* 9, 6, as in the Work.

9 pair of Hoſe. at 7*s.* 6*d.* *per* Pair.
9

*l.*3, 7, 6 Anſwer.

11 Gallons of Wine at 5*s.* 4*d.* *per* Gallon,
11

12, 18, 8, Anſwer.

12 C Sugar, at 35 s. 6*d*. *per* C.
12

*l*. 21,06,00 Anſwer

In this Example I ſay, 12 times 6 is 72*d*. 0, and carry 6*s* and 12 times 5 is 60, and 6 is 66, I ſet down 6 *s*. in the place of Shillings, and carry 6 for the 6 Tens, then 12 times 3 is 36, and 6 is 42, or 42 Angels, the half of which is 21, ſo the Anſwer is *l*. 21, 06, 00, as in the Operation.

When the Quantity exceeds 12, find two Numbers, which multiply'd together, will make the Quantity, then multiply the Price by one of the Numbers, and the Product of the firſt by the other Number. Example

24 Ells of *Holland*, at 3*s*. 3*d*. *per* Ell
6 and 4
19, 6
4
3, 18, 0 Anſwer.

or

3*s*. 3*d*.
12&2
1, 19, 0
2
3, 18, 0

This Example is wrought two Ways; that is, Multiply by 6 and 4 or by 12 and 2, both which give the ſame Anſwer, and each multiply'd together, produce the Quantity, *viz*. 24

When the quantity is ſuch a Number that no two Numbers multiply'd together will exactly make it, then multiply with two ſuch Numbers, as multiply'd together come neareſt to the Quantity; and multiply the Price by the Part that is wanting, and add the two Products together, Example.

26 Gallons of Brandy, at 8*s.* 4*d.* *per* Gallon.
4 and 6

l. 1, 13, 4
6

l. 10, 00, 0
s, 8'4 Multiply'd by 16, 8
2 that is wanting.
l. 10, 16, 8 Anſwer.

---

## *The Double RULE of THREE,*

THIS Rule is compos'd of 5 given Numbers, and teaches by them to find a ſixth in proportion. Of theſe 5 Numbers, the firſt 3 always contain a Suppoſition, and the two laſt a Demand:

Ex. 1. If 100l. in 12 Months gain 5l. Intereſt, what will 84l. gain in 5 Months? The Suppoſition lies on a 100l. 12 Months and 5l. and the Demand on 84l. and 5 Months; for 'tis ſaid, what will 84l. gain in 5 Months?

In the firſt Stating you muſt always obſerve, that the Number of the ſame Name with the Number ſought, muſt be the middle Number; and one of the other Numbers in the Suppoſition (it matters not which) muſt be the firſt Number, and that Number in the Demand of the ſame Name with the firſt, muſt be your third number and then your firſt ſtatin
l. P. l. I. l. P.
will ſtand thus, If 100 —— 05 —— 84 that is, If 100l. Principal gain 5l. Intereſt, what 84l. Principal, and

work'd

l.P. l.I. l.P.
work'd off thus. If 100—05—84
5
———
l. 4, 20 } Anſw. l. s. d. 4, 4, 0
I daſh off two Figures 20
towards the right Hand, ———
which is dividing by 4, 00
100, according to the Rule in Diviſion; then I multiply the remainder 20 by 20, the next inferior Denomination, &c. And ſo much for the firſt Stating and Work ——— gain,

If 12 — 4, 4 — 5
Mo. — l. s. Mo.
20
———
84
5
———
12|420
———
35 Anſwer.

*Note*, As it is in this, ſecond Operation) that the Anſwer to your firſt ſtating muſt always be the ſecond Number in the ſecond Stating.

Thus by theſe two Operations (from whence it is call'd the *double Rule*) is the Anſwer found, *viz.* That if 100*l.* in 12 months gain 5*l.* Intereſt 84*l* in 5 Months will gain 35*s.* as is manifeſt in the Work.

And thus are all Queſtions in this Rule wrought as in the following Examples alſo:

*Ex.* 2. If 15*s.* pay 5 Men for 6 Days, how much will pay 20 Men for 10 Days? Anſwer 5*l.*

Men s. Men Days s.
If 5 Men require 15, what 20? If 6 require 60
Days
what 10?
Anſwer, 100s. or 5*l.*

*Ex.* 3. If 6 Reapers reap 54 Acres in 6 Days, how many Reapers will reap 324 in 9 Days?

Acres Reapers Acres Days Reapers Days
If 54 require 6, what 324? If 6 require 36, what 9?
Anſwer 24 Reapers.

*Ex.* 4. what Principal was it that gain'd 35*s.* in 5 Months, when 100*l.* gain'd 5*l.* in 12 Months?

*s. Int.* *l.P. s. Int.* *Mo.* *l.P.* *Mo.*
If 100 require 100 —35 If 12—35—5. Anſ. 84*l*

12
5) 420 (
84

This Queſtion is the Reverſe to the firſt Example in this Rule.

## *Fellowſhip: Or Company*

THIS Rule teaches us by knowing the ſeveral Parts of which a Joint Stock is compoſed with a ſuppoſed Gain or Loſs reſulting therefrom; how to determine the ſeveral Shares of the Loſs or Gain, in proportion to each Perſons Stock in Company.

Queſtions in this Rule are work'd by the Rule of Three, there being ſo many ſeveral Statings, as there are Members in the Joint-*S*tock.

The total Sum of the ſeveral Stocks is to be the firſt Number in the Rule of Three, the Gain or loſs the ſecond, and each Man's particular Stock the 3d.

*Ex.* 1. Two Perſons enter Partnerſhip, A puts into Stock 450*l.* and B 640*l.* and in 12 Month's Trade they find their neat Profit to amount to 360*l.* the Queſtion is, what is each Man's Share of the ſaid 360*l.* in proportion to his Money in Company.

A 450
B 640

*l.* *l.* *l.* *l.* *l.*
If 1090—360—450 If 1090—360—640

(*Here the Fractions make a Farthing.*

These Statings work'd according to the Nature of the Rule of Three give A for his Share ——— *l.* 148,12,5$\frac{1}{2}$ $\frac{98}{109}$
And B for his Share ——— 211, 7,6$\frac{1}{4}$ $\frac{11}{109}$

Which added together makes juſt—360,0,0 109 and is a ſure Proof of the Works being Right.

*Ex.* 2 Two Perſons enter into Company C put in 50*l.* D put in 70*l.* and they gain'd 150 *l.* I demand each Man's Share of the Gains?

C 50*l.*
D 70*l.*

| l. | l. | l. | l. | l. |
|---|---|---|---|---|

If 120—gain 150, what 50 If 120 gain 150, what 70

Work according to the Tenour of the *Rule of Three* & you will find that C muſt have 62,10,0
and D muſt have ——— —87 10,0

which makes ——— 150,00,0 Gain

*Ex.* 3. Three Men Company *E* put in 90*l.* F 75l. and G put into Stock 84l and they gain'd l 130, 10s. what is each Man's Share of the Profit?

E 90
F 75
G 84

l. s. l. l. l. s. l
If 249—130, 10—.90 If 249—.130, 13—.75.
If 249—130, 10,—84

Here the Fractions make a Halfpenny, which is carried to the Farthings &c.

| | | l. | s. | | |
|---|---|---|---|---|---|
| Anſw | E | 47, | 3 | 4$\frac{1}{4}$ | 231 |
| | F | 39, | 6 | 1$\frac{1}{2}$ | 234 |
| | G | 44, | 0 | 5$\frac{3}{4}$ | 83 |

Proof *l.* 130, 10, 0

Ex. 4. Suppoſe 4 Butchers hire a Piece of Ground for a certain Time for 8*l.* into which H put 4 Oxen, I 6 Oxen, K 10 Oxen, and L 12 Oxen, what muſt each Butcher pay of the 8*l.* in proportion to the Beaſts put in?

| | | | | *l.* | *s.* | *d.* |
|---|---|---|---|---|---|---|
| H | 4 | Anſ. | H | 1, | 00, | 0 |
| I | 6 | | I | 1, | 10. | 0 |
| K | 10 | | K | 2, | 10. | 0 |
| L | 12 | | L | 3, | 00, | 0 |

*l.* Oxen O.*l.*O.

If 32 Oxen pay 8 what 4 &c. If 32,8,6 *proof* 8, 00. 0

Ex. 5. Admit three Perſon joyn in the Purchaſe of a Parcel of Muſlins amounting to *l.* 205, of which M paid 50*l.* N 75*l.* and O 80*l.* and they proving to be damaged, there was loſt in the Sale 30*l.* What muſt each Perſon bear of the Loſs?

*l.*
M 50
N 75 } 205
O 80

*l.* *l.* *l.* *l.* *l.* *l.* *l.* *l.* *l.*
If 205 loſe 30, what 50? If 205, 30, 75, If 205, 30, 80
Here the Remainders added M 7, 6, 4—20
together make the Diviſor, & N 10, 19, 6—30 } Remainders
make 1 Penny to be carried O 11, 14, 1—155
to the Pence, &c.

Proof *l.* 30, 00, 0.

When this Rule hath Relation to any particular Time, then you muſt multiply each Man's Stock by his Time, and add all the Products together; which Total muſt be the firſt Number, and then Work as before.

*Intereſt*

# *INTEREST*

*Definition.* WHEN any Sum of Money is lent by one Perſon to another, the Money lent is call'd, *The Principal*; and the Money to be paid in Conſideration by the Borrower to the Lender, is call'd, *Intereſt*, or *Uſe Money*, for the continuance of the Principal in the Borrower's Hands or Cuſtody.

Intereſt is either Simple or Compound.

Simple Intereſt is that Money that grows, or ariſes from the Principal only, at ſuch a Rate *per Cent. per Annum*, according to Law; as the Rate at preſent is at 5 *per Cent. per Annum*.

Compound Intereſt is the Intereſt of the principal and (if it continues longer than the ſtated Time) Intereſt upon the Intereſt due from the ſaid principal, and therefore call'd *Intereſt upon Intereſt*.

Queſtions in ſimple Intereſt may be anſwered by the ſingle or double *Rule of Three*.

By the ſingle *Rule of Three*, when the ſimple Intereſt of any Principal for any Time is known, then the ſimple Intereſt of any other Principal (at the ſame Rate of Intereſt) for the ſame Time may be found; as in the following Examples.

Ex. 1. If 100l. gain 6l. Intereſt in one Year, what will 364 gain in the ſame Time? Anſ. 21l. 16*s* 9*d*.$\frac{1}{2}$ State it as by the *Rule of Three*, & work it accordingly.

```
 l.      l.      l.
100 —— 6 ——— 364
               6
          ———————
          21, 84
              20          l.   s.   d. ½
          ———————    } Anſ. 21, 16, 9  40/100  or
          16, 80
              12
          ———————
           9, 60
               4
          ———————
           2, 40
```

According to the *Rule* of *Three*, I multiyl'd the third Number by the ſecond, and divide by the firſt, which is moſt expeditiouſly done by ſeparating or cutting off 2 Figures towards the right Hand, by a Comma, or downright Stroke, and the Figures towards the left Hand are Pounds, then I multiply the Remainder 84 by 20 the next inferior Denomination, and then cut off 2 Figures towards the Right, and the two Figures towards the Left to wit, 16 are 16 *s.* then I multiply the Remainder 80 by 12, the next inferior Denomination, and do as before, and there quotes 9*d.* then I multiply by 4, &*c.* ſee the Work

*Ex.* 2 What's the Intereſt of 400l. 12s. 9d. for 1 Year, at 5 *per Cent. per Annum?*

5 *per Cent*

Anſ. l. 20,00,7$\frac{1}{2}\frac{60}{100}$ or $\frac{6}{10}$ l. 20,03,9
20

s. , 63
12

d. 7, 65
4

qrs. 2, 60

An. 20.00,7$\frac{1}{2}$

You muſt always, as here, multiply the principal by the Rate of Intereſt, according to the Method of multiplying Money in the *Rules* of *Practice* by Multiplication, carrying from one Denomination to the next, as in *Addition* of *Money*, &c. as here I ſay, 5 times 9 is 45*d.* or 3*s.* 9*d.* I ſet down 9 and carry 3 *s.* and 5 times 12 is 60 and 3 is 63, or 3l. 3*s.* I ſet down 3, and carry 3l. then 5 times 0 is 0, but 3 is 3; and 5 times 0 is 0, and 5 times 4 is 20; then I cut off 2 Figures towards the Right, as before, then I multiply 20, taking in the 3*s* & cut off as before, but no Figures coming to the left there are no Shillings; then I multiply by 20, taking in the 9*d.* and do as before, and then there comes out 7*d.* Laſtly, I multiply by 4, (but there are no Farthings to take in) and ſeparate 2 Figures to the Right, and to the left Hand there quotes 2 Farthings as in the Work. Thus all Queſtions of this Kind in *ſimple Intereſt* may be wrought let the Rate be what it will.

This Method is very expeditious, and very eaſy to be underſtood, and therefore needs no further Explication.

When the Rate hath a Fraction annexed to it, as 5½ 6½ 8¾ and 2½ *per* Cent. then after you have multiply'd the Principal by the whole Number, that's by 5, 6, 8, or 2, then take ½ ¼ ¾, *&c.* of the Principal, and add it to the Product of the Principal multiply'd by the whole Number, (according to the Method preſcrib'd in *Multiplication*, of multiplying by a mixt Number) and then daſh off 2 Figures towards the right Hand, and proceed as before, as in this Example:

```
                                  l.  s.  d.     l.
Ex. 3. What's the Int of 365, 10, 6½ at 5½ p. C. p. A
                                           5
                       ————————————————
      l.  s.  d.         1827, 12, 8½
the ½ of 365, 10, 6½ is — 182, 15, 3¼
                       ————————————————
Here after I   20, 10, 7, 11,¾ ⎤
have added the      20         ⎥
fractional Part ——————————     ⎥
I work in the     2,97         ⎥
ſame Manner        12          ⎥      l. s. d.
as in the 2d.  ——— ——— ——     A. 20, 2, 0, ¾ 83/100
Example pre-      ,95          ⎥
ceeding, as is      4          ⎥
ſeen in the O- ———————         ⎥
peration.         3, 83        ⎦
```

*l.* *s.* *d.* *l.*

*Ex.* 4. What's the Int. of 746, 12, 9 at $8\frac{3}{4}$ *p.Cent.*

8

5973, 02, 0

$\frac{1}{2}$ 373, 6, $4\frac{1}{2}$

$\frac{1}{2}$ 186 13, $2\frac{1}{4}$

65, 33 ,01, $6\frac{3}{4}$

20

6, 61

12

7, 38

4

2. 55

Anſwer.

*l.* *s.* *d.*

65 6,7, $\frac{1}{41}$

Thus much may ſuffice to find the Intereſt of any Sum of Money for a Year.

---

## *Calculation for Parts of a Year, or a longer Time.*

F*irſt*, Work for the Year, as before, then take Parts of the Intereſt of the whole Year, according to the Time mentioned.

*Example.*

What's the Intereſt of 46 l. 10 *s.* for 5 Months at 5 [5 *p. Cent p. An.*

*l.* 2, 32, 10

20

*s.* 6, 50

12

*d.* 6, 00

A. for a Year *l.* 2, 6, 6

4 Months is of a Year the $\frac{1}{2}$ 15, 6

1 Month is of 4 Months the $\frac{1}{4}$ 3, 10 $\frac{1}{2}$

Anſwer 19, 4$\frac{1}{2}$ { for 5 M:

So the Intereſt of 46 *l.* 10 *s* for 5 Months at 5 *per* Cent. *per Annum*, is 19 *s.* 4 *d* $\frac{1}{2}$ : as in the work.

*l.* *s.* *d.*

*Ex.* 6. What's the Intereſt of 275, 19, 9 at 7 *p. C. per* 7 [*An* for 9 M

*l* 19, 31, 18, 3

20

*s.* 6, 38

12

*d* 4, 59

9

*qrs* 2, 36,

*l. s. d.* { for aY
19, 6, 4, $\frac{1}{2}$

6m. $\frac{1}{2}$ 9, 13, 2 $\frac{1}{4}$

3m. $\frac{1}{2}$ 6m 4 16, 7

Anſ. *l.* 14, 9, 9, $\frac{1}{4}$ { for 9 M.

What's the Intereſt of 896*l.* 9 *s.* 8*d.* for 4 Years and 8 Months 6 *l* ¼ *per* Cent. *per* Annum?

6

---

5378, 18, 0
¼ 224, 2, 5

---

56, 03, 00, 5

---

20

---

, 60
12

---

7, 25
4

---

1, 00

*l.* *s.* *d.*
56, 00, 7 ¼ for 1 *Year*
4

---

224, 02, 5, for 4 *Years*
⅓ 18, 13, 6¼ for 4 M.
⅓ 18, 13, 6¼

---

*l.* 261, 09, 5½

The Intereſt of 896 *l.* 9*s.* 8 *d.* for 4 Years and 8 Months. So much for the Intereſt of an odd Sum, at an odd Rate, and for an odd Time, which (with the *Examples* before) comprehends all Difficulties that can ariſe in *ſimple Intereſt.*

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## *Factorage, Brokeridge, Inſurance &c.*

BY the Method of 2d, 3d, and 4th Examples, may all manner of Factorage, Brokeridge, Inſurance, or Avarage, (or any thing elſe, if at ſo much *per* Cent) be calculated

*Ex.* 1. What muſt a Factor have for his Commiſſion of SALES, when the ſum amounts to 249*l.* 18*s.* 6*d.* if his Allowance be 5 *per* Cent.

5

12, 49, 12, 6

20

9, 92

12

11, 10

*l.* *s.* *d.*

Anſwer 12, 9 11

*Ex* 2. To what amounts the Proviſion to of 865 *l.* 11 *s.* 4 *d.* at 2 ½ *per* Cent.

2

1731, 2, 8

½ 432, 15, 8

21, 63, 18, 4

20

12, 78

12

9, 40

4

1, 60

*l.* *s.* *d.*

Anſwer 21, 12, 9¼.

What's the Brokeridge of Goods ſold to the value of 98, 13*s.* 0*d.* at ½ *per* Cent. Anſwer 9*s.* 10*d* ¼

49, 6, 6
20

9, 86
12

10, 38
4

1, 52

Here the ½ of the principal Sum is taken and then I work as before

*s.* *d.*
Anſ. 9, 10¼

What's the Inſurance of 560, 10 at 10 Guinea's *per* Cent

10

5605, 00
10*s.* ½ 280, 5

85, 5
20

17, 05

A. 85*l.* 17

When the Rate is at 5 *s. per* Cent take the 4th Part of the given Sum, and work as before,

When the Rate is at 10 s *per* Cent take half and work, as in the 3d *Example*

When the Rate is at 15 s *per* Cent take half, and the half of that half and add both together

When the Rate is at 20 s *per* Cent. only daſh off two Figures, as before, and then multiply by 20 *per* 12 *&c*

## Compound Intereſt.

l. s.

WHat's the Int. of 264, 12 to continue for 3 Years, at 5

5l. p. C. per An. Int. upon Int.

13, 23, 00 .264,12

20 13,4,7 1ſt Yr

l. 277, 16, 4, 60 277.16,7

13, 17, 9¾ 12 5

l. 291, 14, 4¾ 2d Yr. 7, 20 1389,02,11

5 20

14,58,11,11,¾ 17,82

20 12

11,71 .291, 14, 4¾ 9,95

12 14, 11, 8½ 4

8,63 3,80

4 .306,06,1⅕ laſt Year. Anſwer

2,55

Here I firſt ſeek the Intereſt of the Money for the firſt Year, and find it .13, 4, 7, which I add to the Principal l.264, 12, 0, which makes .277, 16, 7 for Principal and Intereſt due the firſt Year; then I proceed in the ſame Manner to find the Intereſt of that, and find it to amount to *l.* 13, 17, $9\frac{3}{4}$ which add to *l*277,16,7,the Principal and Intereſt of the rſt Year,and it makes *l.*291, 14, $4\frac{3}{4}$ for the ſecond ear; the Intereſt of which I find to be *l.*14,11 $8\frac{1}{2}$ hich added to *l.*291, 14, $4\frac{3}{4}$,the Principal and In. reſt of the ſecond Year, gives *l.*306, 06, $1\frac{1}{4}$, for e Principal and Intereſt of the 3d. & laſt Year,& ſo uch is due for the Loan of *l.* 264, 12, 0,to con inue for 3 Years at Intereſt upon Intereſt. This is e Vulgar Way,[and eaſieſt for Common Capacities] for calculating *Compound Intereſt*; *i. e.* to add e firſt Years Intereſt to the ſecond,and the ſecond ears Intereſt to the third, *&c.*

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# DISCOUNT.

Diſcount is when a Sum of Money hereafter due is ſatisfy'd, by paying down ſo much preſent Money; which if put to Intereſt at ſuch a Rate, would increaſe it ſelf to the Sum firſt due.

Ex. 1. What is the Diſcount of 324 *l.* 15*s.* 6*d.* for 4 Months at 6 *per Cent. per Annum*?

To do this firſt ſee what Part of a Year the time is,and take that Part of the Rate of Diſcount, and add to 100l. and then by the *Rule of Three* ſay, If 100. and the Money of the Rate added, Diſcount the Part of the Rate, what Diſcount will 324 15*s* 6*d* Diſcount?

he Time of Diſcount in this *Example* is 4 nths, which is the $\frac{1}{3}$ of a Year, wherefore I take $\frac{1}{3}$ of 6*l.* the Rate of Diſcount, which is 2*l.* which added to 100*l.* makes 102*l.* then I ſay

l. l. l. *s.*
If 102 diſcount 2 what will 324, 15 Diſcount?
20 20
2040 6495
12 12
24480 77940
2
*l. s. d.*
2448,0) 155880) 6, 7, 4, $\frac{576}{2448}$ Anſ.
14688
900
20
Firſt due l. 324, 15*s.* ) 18000 ( 7 s.
Diſcounted 6 7 4 17136
864
Paid down l. 318, 7 8 12
10368 ( 4*d.*
9792
576

By the Work I find the Diſcount to be 16, 7, 4, which I deduct from the Money firſt due, and there remains l. 318, 8, to be paid down in full Satisfaction for 324 *l.* 15 *s.* 6, the Sum, firſt due. Thus by this Method of Working, may any Sum of Money be diſcounted, at any Rate, for any Time.

*Ex.* 2 What's the Diſcount of 275 *l.* for 6 Months at 5 *per* Cent.

*l* *s.* *l.* *s.* *l.*
If 102, 10 abate 2, 10 what 275 ?
Anſwer 6*l.* 14*s* 1*d.* $\frac{3}{4}$ $\frac{50}{3050}$.

In this *Example*, 6 Months is $\frac{1}{2}$ a Year wherefore I take the $\frac{1}{2}$ of 5 *l.* and add it to 100 l. *&c.*

*Ex.* 3 Bought Goods to the value of 106 l. 16*s.* 0, on 9 Months Diſcount, at 4 *per* Cent. *per* Annum, what muſt be paid down? Anſwer 103 l. 13 *s.* 9 *d.* $\frac{1}{2}$

4

6 Months $\frac{1}{2}$ } 2 l. If 103 diſcount 3, what l. 106, 16 s. ?
3 Months $\frac{1}{2}$ } 1
Mo.

l. 3

Ex. 4. Sold Goods to the value of 376 l. on 7 Mo. Diſcount at 8 *per* Cent. *per* Annum, what muſt be paid down ? Anſwer 359 l. 5 s. 11 *d.*

8 l.

6 Mo. $\frac{1}{2}$ } 4
1 Mo. $\frac{1}{6}$ } 0, 13, 4
of 6 M. }
l. 4, 13, 4 If 104 l., 13 s., 4 d. dif. 4 l., 13 s. 4 d., wt 376 l.

First due l. 376, 00, 0,
The Diſcount 16, 14, 1

To be pd down l. 359, 5, 11

Barter

---

# *BARTER.*

BARTER is no more than the Exchaning of one Commodity for another; but ſo to proportion their Rates, as that neither Party ſuſtains Loſs.

So that by knowing the Worth of the Commodity barter'd for in ready Money, and what I muſt have it for in *Barter*, I may ſet a Price on my own Goods anſwerable thereto.

*Ex.* 1. Two Men Barter, *viz*. A and B, A hath 3 C½ of Pepper, at 13*d*½ *per* lb, and B hath Ginger at 15*d*¼ *per* lb I demand how much Ginger muſt be given to A for his Pepper?

Firſt ſee by *Practice* what the Pepper comes to at 13*d*½ *per* lb, & you'll find it amount to *l*. 22, 01, 0, then ſay by the *Rule of Three*, If 15*d*¼ buy 1*lb*, of Ginger, what will 22*l*. 1*s*. buy? Work according to the *Rule of Three*, and you will find, that 374 *lb*, of Ginger muſt be given by B to A for his Pepper, and 1 Farthing remains: And as a Proof of which, if you caſt up the odd 347 *lb*, of Ginger at 15*d*¼ *per lb*, and take in the odd Farthing remaining, you will find it amount to juſt 22*l*. 1*s*. the Price of the Pepper; ſo that there is Value for Value in Money, ough the Commodities and Prices are different.

*Ex*. 2. Suppoſe C hath Nutmegs worth 7*s*. 6*d*. *per. lb*, ready Money, but in Barter he will have 8*s*. *per l*. and hath Leaf Tobacco worth 9 *d p. lb*. ready Money, the Queſtion is how D muſt rate his To-bacon *per* ℔ in Barter, that his Profit may be equivalent with C's? State the Queſtion thus ;

It 90*d* riſe to 96*d*, what muſt 9 *d* riſe to? Anſwer, to 9*d*. ½ as may be found by the Operation. And the Conception is Natural and Eaſy, for 90*d* is raiſ'd to half a Shilling, and 9*d* riſes to Half a Penny.

*Ex.* 3. If E hath 114 ℔ weight of Tobacco at 6*d per* ℔, how much Cotton at 14*d per* ℔ muſt ? F give E for the Tobacco? Anſwer, *l.* 48 6/7 —The Tobacco at 6 *d per* ℔ comes to 57 *s* then ſay, If 14 *d*. buy 1 ℔ of Cotton, what will 57 *s*. buy? By the work it will be found *l.* 48 6/7, as above.

*Ex.* If *G* hath 80 Cloths at 3 *l per* Piece ready Money, but in Barter he will have 4 *l per* Cloth, H has Wools at 7*l* 10*s per* C. which are worth but 6*l. per* C. in ready Money; I demand what Quantity of Wool pays for the Cloths, and which of the Two is the Gainer, and how much?

|  | *s.* | C. | *s.* |  | C. | qrs. | *l.* |
|---|---|---|---|---|---|---|---|
| If | 150— | 01—— | 6400 | Anſ. | 42 | 2 | 18 |
|  | *s.* | *s.* | *s.* |  | *s* |  |  |
| If | 60—— | 20—— | 120 | Anſ.. | 40 |  |  |

Whereas he riſes but 10*s*. in Barter, ſo that C gains 16 *l*. by the Barter

*Ex.* 5. Indigo at 4*s* 6*d per* ℔ ready Money, but in Barter at 5 *s* 4*d*. How muſt Galls at 16 *d per* ℔ ready Money be rated in Barter to make an equivalent Profit

|  | *d* | *d* | *d* |  | *d* |
|---|---|---|---|---|---|
| If | 54—— | 64—— | 16 | Anſwer | 18 ¾ 46/54 |

*Ex.* 6. Admit I have Holland at 5*s per* Ell ready Money, barter'd at 6*s per* Ell to K for Broad Cloth at 9*s* 6*d* *per* Yard which coſt but 8 s *per* Yard; which gaineth moſt, and how much *per Cent*?

s s l l
If 5——6 —— 100 Anſwer 120 *per Cent*?
s *d* l
If 8—— 114 —100 Anſwer 118, 15 *per C.*

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# EXCHANGE

EXCHANGE is the receiving of Money in one Country or Nation and paying it again in another, Value for Value, with reſpect to the ſeveral Species of Coin or Money of each Country or Nation.

*Flemiſh Money*——2 *Groats* 1 *Stiver*——6 *Stiver*
1 *Shilling*——20 *Stivers* 1 *Guilder*——6 *Guilder*
1 l. Fl*emiſh*.

Queſtions in this Rule are for the moſt Part anſwer'd by the Rule of Three, and are ſuch as theſe that follow:

*Ex.* 1 Remitted from *London* to *Rotterdam* a Bill of Exchange of 260 l Sterling the Exchange at 33s 4*d* Flemiſh *per* l Sterling what Flemiſh Money muſt the Bill be drawn for

```
     s. Sterling.    s. 4d. Flemiſh.   l. Sterli.
If 20 ————————— 33, 4 ————————— 260
                  12                20
                ————              ————
                 400              5200
                                   400
               2, 0)          208000, 0
                              ——————————
2 Groots 1 Stiver 2) 104000
                     ——————
20 Stivers 1 Guilder 5200, 0
                     ———————
         Anſwer      2600 Guilders
```

*Ex.* 2. Remitted from *Amſterdam* to *London*, 487*l.* 12, 6 *Flemiſh*, the Exchange at 36*s Flemiſh* for 20 *s. Sterling*; the Queſtion is What Sterling Money muſt be received for the ſaid Bill of 487 *l.* 12 6 *Flemiſh*

```
   s. Flem.  s. Sterl  l. Flem.           l. Sterl.
If 36 give  20  what 487, 12 6 Anſ. 270. 18 10
```

*French* Money
12 Deniers 1 Sol
20 Sols 1 Livre
3 Livres 1 Crown

*Ex* 3. How many *French* Crowns muſt be drawn by Bill of Exchange for 216 l. 17 10 *Sterl* the Exchange at 57 *d* $\frac{1}{8}$

```
  d s    Sols Fr  l.  s. d.  Sterl   Crown Liv. S.
If 57⅛—60 — 210, 17 10        Anſ. 889 00 1
```

*Ex.* 4 For what Sterling Money muſt a Bill be drawn in *Paris* and payable in *London*, to Anſwer 1510 Crown 2 Liv. 10 Sols the Exchan. at 55 *d.*

```
  S.    D.     Cr. Liv. S.        l.  s. d.
If 60 —55 — 1510  2  10 Anſ. 347 00 4⅝
```

*Ex.* 5. How many Rix.dollars at 60 *d.* may be drawn for a 1000 *Naples* Ducats, at 52*d.*

If 52 ——— 1000 ——— 60 Anſwer 836$\frac{2}{3}$

This Example is wrought by an inverted Proportion; for there muſt be fewer Pieces of 60*d.* given, than of 52*d.* wherefore the greater Extream is the Diviſor' which is the 3d. Number.

In Queſtions where a Compariſon is made of Weights or Meaſures of different Places, ſuch Queſtions may be anſwered by one ſingle *Rule of Three*, as in theſe Examples.

*Ex* 6 If 100 Ells of *Antwerp* make 75 Yards at *London*, how many Yards of *London* Meaſure will 27 Ells of *Antwerp* make? Say

Ells *Antw.* Yds *Lond.* E *Antwerp.* Yds.
If 100 ——— 75 ——— 27 Anſwer 20$\frac{1}{4}$

Ex. 7. Again If 100 *l.* *Avoirdupois* in *London* be equal to 89*l* in *Paris*, how many *l.* of *Paris* Weight are equal to 340l. *Avoirdupoize* in *London*? Say

*l. Lond.* *l. Par.* *l. Lond.*
If 100 be 89 what 340 Anſwer 302$\frac{3}{5}$

## *PROFIT and LOSS.*

MAY be comprehended under theſe four Heads: *viz.*

1*ſt.* To know what is gain'd or loſt *per Cent*

2*dly.* To know what a Commodity ought to be ſold for to gain or loſe ſo much *per Cent.*

*3dly.* Having gain'd or loſt ſo much *per Cent.* to know what the Commodity coſt.

*4thly*, If a Commodity ſold at a given Rate, do gain or loſe a given Rate *per Cent.* how much will be gain'd or loſt *per Cent.* if it be ſold at another Rate

## *To know what is gain'd or loſt* per Cent

*Ex.* 1 If a yard of Cloth is bought at 11*s.* and is ſold for 12*s.* 6*d.* how much is gaind *per Cent* ?

|  | *s.* | *d.* |  |
|---|---|---|---|
|  | 12 | 6 |  |
| *Subſt.* | 11 | 0 |  |
|  | 1, | 6 | gain'd on every Ell |

Then ſay, If 11*s.* gain 18*d.* what 100*l.* Anſwer, 13*l.* 12*s.* 8*d.* $\frac{8}{11}$ *per Cent.*

*Ex.* 2. If 1 ℔ Tobacco coſt 16*d.* and is ſold for 20*d.* what is gaind *per Cent* ? Say,

If 16*d.* gain 4*d.* what 100*l.* Anſwer 25*l. per Cent.*

Here the Proportion is very Obvious, for as 4 is the 4th of 16, ſo is 25 of 100.

The like Method is uſed to diſcover Loſs.

## *To know what Goods ought to be Sold for to gain or loſe ſo much* per Cent.

*Ex.* 5. If 100 ℔ of Hops coſt 4*l.* what muſt 1 ℔ be ſold for to gain 10 ℔ *per Cent* ?

*Rule* ——— Make 100*l.* the firſt Number in the *Rule of Three*, the Price the ſecond, and 100*l.* with the Gain added, or the Loſs ſubtracted, the third ; Thus,

If

*l.* *l.* *l.* *l.* *s*

If 100 ——— 4 ——— 110 Anſwer 4, 8

*l* *l.* *s.* *l.* *d.*

Again, If 100—4, 8—what 1 Anſ. 10$\frac{1}{2}\frac{14}{100}$. *p* ℔

By the firſt Working I find what the Whole muſt be ſold for to gain 10 *per Cent.* and by the ſecond, what a ℔ muſt be ſold for to the ſame End.

Ex. 4. If 60 Ells of Holland coſt 18*l.* what muſt 1 Ell be ſold for to gain 8 *per Cent* ?

*l.* *l.* *l.* *l.*

If 100 —— 18 —— 18 Anſwer 19, 8. 9 $\frac{1}{2}\frac{4}{1}$.

Ells *l.* Ell *s.*

If 60 ——— 19, 8, 9$\frac{1}{2}$ what 1 Anſw. 6, 5½ *p.* Ell

And ſo for the Loſs

## *Having Gain'd or Loſt, ſo much* per Cent: *to know what the Goods coſt.*

*Ex.* 5. If a Parcel of Cloth be ſold for 560*l.* and 12*l. per Cent.* gain'd, what did the Cloth coſt ?

*Rule*——Add the Grain to 100*l.* ( or ſubtract the Loſs) and let it be the firſt Number in the *Rule of Three*, 100*l.* the ſecond, and the Principal given the third, &*c.*

If 112l. come to 100*l.* what 560*l.* Anſwer 500*l*

*Ex.* 6. If 40*l.* of Cocheneal is ſold for 51*l.* at 9*l.* *per Cent.* Profit, what is the Price of 1 ℔. at that Rate ?

If 109l decreaſe to 100*l* what 56*l* Anſ. 51l. 7, 6, $\frac{1}{10}$,

Again, If 40 coſt 51*l* 7, 6, $\frac{1}{4}$ what 1*l* Anſw. 25*s.* 8*d.* $\frac{1}{4}$

*If*

### *If Goods ſold at ſuch a Rate, do gain or loſe a given Rate per cent. how much per cent. will be gain'd or loſt, if the Goods be ſold at another Rate?*

Ex. If 1 lb. of Tobacco be ſold for 20 *d.* and there be 25 per cent. Profit, what will be gain'd or loſt if the lb. be ſold for 16 *d*?

Rule —— Let the firſt be the firſt Number in the rule of three, 100 *l.* with the Gain added, or the Loſs ſubtracted, the ſecond, and the other price the third —— So that you muſt ſay.

*d.* *l.* *d.* *l.*
If 20 —— 125 —— 16 Anſwer 25 per cent. Loſt

Ex. 8. If 1 Gallon of Wine be ſold for 8 *s.* at 8 per cent. loſs, what will be gaind per cent. if the Gallon be ſold at 12 *s*? Say,

*s.* *l.* *s.* *l.*
If 8 —— 92 loſs —— 12 Anſ. 38 per cent. profit

## *EQUATION*

EQUATION of Payments teaches us to reduce ſeveral times of Payment, upon which particular Sums of Money are due, unto a mean time, upon which the total of thoſe Sums ought to be paid without damage to the Debtor or Creditor

Ex. 1. Admit a Merchant owes 500 *l.* to be paid at 3 Payments, viz, 300 *l.* at 4 Months, 100 *l.* at 6 Months

Months, and 100*l*. at 12 Months; but it is mutually agreed, That the Whole be diſcharged at one Payment; The Queſtion is At what time that payment ought to be made without damage to debtor or creditor, accounting 5 per cent. per annum Intereſt?

Rule——Multiply each particular Payment by its time, then add all the Products together, and divide the total by the whole Debt.

| *l* | *l* | *l* |
|---|---|---|
| 300 | 100 | 100 |
| at 4 Mon. | 6 Mon. | 12 Mon. |
| 1200 | 600 | 1200 |

1200
1200
600

5,00) 30,00

Anſwer 6 Months is the equated time for the payment of the whole,

Ex. 2, Suppoſe a Merchant oweth 300*l* to be paid $\frac{1}{3}$ at 3 Months, $\frac{1}{3}$ at 6 Months, and $\frac{1}{3}$ at 12 Months I demand at what time the ſaid Sum ought to be paid together?

| *l* | *l* | *l* |
|---|---|---|
| 100 | 100 | 100 |
| at 3 Months | 6 Months | 12 |
| 300 | 600 | 1200 |

1200
600
300

3,00)21,00

Anſwer 7 Months.

*Ex.* 3. A Merchant oweth 450 l. to be paid at three Payments *viz.* $\frac{1}{3}$ at 3 Months, $\frac{1}{3}$ at 5 Months and $\frac{1}{3}$ at 8 Months, and the Debtor and Creditor agree, That the whole Sum ſhall be paid at one Time; I demand what Time it ought to be paid in?

l. l. l.
150 150 150 1200
3 Mon. 5 Mon. 8 Mon. 750
450
450 750 1200

45, 0 ) 240,0 (5 Mo. $\frac{1}{3}$ Anſ.

*Ex.* 4. Suppoſe a Woman's Portion of 340 l. is to be paid at three Payments *viz.* 80 l. down, 100 l at 3 Months and 160 l. at 8 Months, What's the equated Time for Payment?

l. l.
100 160
3 Months 8 Months

300 1280
300

34, 0) 158 0 ( 4 Months $\frac{11}{11}$ Anſwer.
136

(22)

Suppoſe there is 245 l. 10 s 9d to be paid $\frac{1}{3}$ at 6 Month $\frac{1}{3}$ at 8 Months, and the reſt at 12 Months what is the indifferent Time for Payment of the whole Sum together?

| | Mo | | Mo |
|---|---|---|---|
| $\frac{1}{2}$ | at 6 | Anſ | 3 |
| $\frac{1}{3}$ | at 8 | Anſ | 2 $\frac{1}{3}$ |
| $\frac{1}{6}$ | at 12 | Anſ | 2 |

7 $\frac{2}{3}$ Anſwer 7 Months $\frac{2}{3}$

Here becauſe $\frac{1}{2}$ is to be paid at 6 Months, I take $\frac{1}{2}$ of 6, which is 3 Mon. and $\frac{1}{3}$ to be paid at 8 Mon. I take $\frac{1}{3}$ of 8, which makes 2 Months $\frac{2}{3}$; and 6 being the $\frac{1}{2}$ of 12, I ſet down 2 Months, which added together make 7 Months $\frac{2}{3}$ for the indifferent Time of Payment. See the Work.

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# *ALLEGATION*

TEaches to reſolve Queſtions concerning the mixing of diverſe Simples together; and conſiſts of two Parts, *viz.*

## *ALLEGATION MEDIAL*, and *ALLEGATION ALTERNATE.*

*Allegation Medial* is, when having the ſeveral Quantities and Rates of ſeveral Simples propounded, we diſcover the mean Rate of the mixture compounded of thoſe Simples.

*Ex.* 1. Suppoſe a Mealman hath Flour of ſeveral Prices and would mix them ſo, that the Quantity mixed might bear one common Price, and mixes together the Quantity following: *viz.*

$$\left.\begin{matrix}3\\4\\5\end{matrix}\right\}\text{Buſhels at}\left\{\begin{matrix}3.\ 5\\5,\ 6\\4,\ 8\end{matrix}\right\}\textit{per}.\ \text{Buſhel}\left.\begin{matrix}\\ \\ \end{matrix}\right\}\text{The Queſtion is,}$$

What a Buſhel of this mixture is worth?

To do this I add the Number of Buſhels together, which are 12; then what they come to at the different Prices, and it makes 55*s.* 7*d.* then I ſay by the Rule of Three, If 12 Buſhels coſt 55*s.*7. what 1 Buſh.? and the Anſwer is, 55*d*$\frac{1}{2}\frac{1}{3}$ or 4*s.* 7*d.* $\frac{1}{2}$ *per* Buſhel.

Ex. 2 admit a vintner mixes (or parts they call it)
20 Gallons of Port, at 5*s* 4*d* per Gallon, with
12 Gallons of Galetia at 5*s* 0 per Gallon, with
30 Gallons of Lisbon at 6, 0 per Gallon, with
20 Gallons of Viena at 4*s* 6*d* per Gallon ———
82

What is a gall. of this mixture worth ? An. 5*s* 3*d* $\frac{3}{4}$ $\frac{50}{82}$
after I have caſt up the ſeveral Articles by Practice
I find them amount to 436*s* 8*d* then I ſay,
If 82 gall. coſt 436*s*. 8*d*. what 1 gall. Ans. 5*s*. 3 *d*. $\frac{2}{3}$

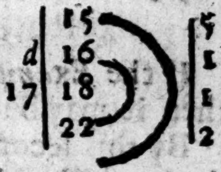
To prove this Example, or any other in this Rule, find the Value of the whole Mixture according to the mean Price found, and if it agree with the total Value of the ſeveral Quantities, at the ſeveral Prices the Work is Right. As here, 82 gallons, at 5*s* 3*d* $\frac{3}{4}$ &*c*. per gallon, will amount to 436*s*. 8*d* the total Value of 82 gallons at different Prices.

### *Allegation Alternate.*

Is when having the Rates of divers Simples, we diſcover ſuch Quantities of them, as are neceſſary to make a mixture, which may bear a certain Rate propounded.

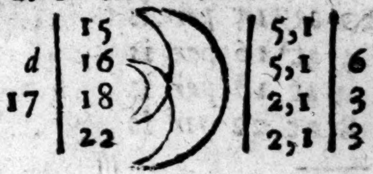
Ex. 3. As, Suppoſe a Tobacconiſt determines to mix 20 l. of Tobacco at 15 *d* per lb. with other ſorts of ſeveral Prices *viz*. ſome of 16 *d*. ſome of 18 *d*. and ſome of 22*d*. per lb. the Queſtion is, How many lb of each Sort he muſt take to make 1 lb. of that Mixture worth 17 *d*.

*Firſt*, Set down the mean Rate, or price propounded on the Left-hand, & the given Rates on the Right, orderly under one another *Secondly*, Link the



Numbers placed on the Right-hand together with a crooked or arch'd Line in ſuch ſort that one that is greater may be link'd with one that is leſſer than the mean Rate ſo will the Number be plac'd and link'd as in the Example, *Thirdly* having link'd the Numbers, find the Difference between the Numbers and the mean Rate, and ſet down the difference of each Number, juſt againſt the Number that is couple with it; When one Number is link'd to divers other Numbers, the Differences ought to be as often tranſcribed as it is diverſly linkd, ſo in the *Example* you may link the Numbers as in the Work.

When one and the ſame Line there are found more Difference then one, add them together, and write the Sum juſt againſt the ſame Differences, have firſt drawn a Line. then the Queſtion may be anſwered by 3 Statings, and Working by the *Rule of Three*, thus: If 5 (the Difference annexed to the firſt Nnmber) give 1, (the Difference to the ſecond Number) what will 20 give? (the given Quantity of the firſt ſort of Tobacco) at 15 *d* 1.



Again for the Quantity of the 3d Sort, ſay, } If 5 give 1 what 20 (4 A
If 5 give 1, what 20 (4 A
Laſtly, ſay ——— If 5 give 2, what 20 (8 A

So that from theſe Operations I conclude, That if with the $20^{l}$. at 15*d. per* l. you mix 4 l. of Tobacco at 16*d.* and 4 l. at 18*d. per* l. and 8 l. at 22*d.* l. 1 l. of that Mixture of Tobacco may be ſold for 17*d.*

If the *Example* be work'd after the ſecond Order, then it may be ſtated thus:

If 6 give 6 what 20 (20 Anſ.
If 6 give 3 what 20 (10 Anſ.
If 6 give 3 what 20 (10 Anſ.

By this ſecond Method of Working, I conclude, That if with 20 l of *Tobacco* at 15 *d* *per* ℔ there be mixed 20 ℔ at 16 *d* and 10 ℔ at 18 *d* and 10 ℔ at 22 *d per* ℔ 1 ℔ of Tobacco of this Mixture may be ſold for 17 *d* as before

The Truth of this Rule may be proved by comparing the total value of the ſeveral Simples, with the Value of the whole Mixture, So in the laſt *Example* propounded.

| ℔ | | *d* | | ℔ | *d* |
|---|---|---|---|---|---|
| 20 | at | 15 | *per* | is | 300 |
| 4 | at | 16 | *per* | is | 64 |
| 4 | at | 18 | *per* | is | 72 |
| 8 | at | 22 | *per* | is | 176 |

36 ℔ at 17 *d* (the Price propounded) is alſo 612 *d*

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## *The* RULE *of* FALSE

THE Rule of Falſe is always performed by falſe or ſuppoſitial Numbers (from whence it hath its Name) taken at Pleaſure by which we diſcover the True Terms required

*The Rule of Falſe* is either *ſingle* or *double*

The *ſingle* Rule is when by one feigned, or ſuppoſed Number, we find the true Number ſought.

*Ex.* Suppoſe the 3d Part of an Army were kill'd; the 4th Part were taken, and 1000 fled; the Queſtion is, What Number of Men in the Army were kill'd And how many were taken Priſoners?

Suppoſe the Army conſiſted of 600 Men, then there were 200 Men killed, and 150 taken Priſoners, and 250 fled but 'tis ſaid that there were 1000 fled wherefore ſay, If 250 —— 600 —— 1000 Anſwer 2400

So that by the falſe Supoſition 600 I find the true Number of Men that the Army did conſiſt of 2400; the Third of which is 800 for the Men kill'd; and 4th is 600 for thoſe taken Priſoners which with the 1000 that fled make 2400 As in the Work.

$\frac{1}{3}$ is 800
$\frac{1}{4}$ is 600
1000
———
2400

*Ex.* 2. Admit a Man dies, and leaves 120 l. to be given to 3 Perſons, *viz.* A. B. C. as follows, A to have a Share unknown. *B* to have twice as much as A and C 3 times as much, what is the Share of each?

Suppoſe A had 15 l. then B muſt have 30 l and C 45 l which added together make but 90 *l* which ſhould be 120 l wherefore I find their reſpective, Shares by Proportion. *viz.*

1 1 1 1
If 90—120—15 Anſwer 20 A's Share

So by finding A's Share to be 20 *l.* } 40 B's Share
then B's muſt be ——————
and C's Share muſt be ——— ——60 C's Share

which added together make————120 the Total

of the Money left ———

Ex. 3 A Man overtaking a Maid driving a Flock of Geeſe ſaid to her, How do you do Sweet-heart? whether are you going with thoſe 30 Geeſe? No Sir, *ſaid ſhe*, I have not 30, but if I had as many more, and half as many more, and 5 Geeſe beſides, I ſhould have 30. The Queſtion is, How many Geeſe ſhe had?

Suppoſe ſhe had 12, then as many more make 24, and half as many more make 30, and 5 Geeſe beſides make 35; then I ſay, If 35 come of my Suppoſition 12, what will 30 require? Anſwer 10.

```
        12
       ———
  35) 360 (10 Anſwer
       35
      ———
       (10)
```

*Ex.* 4. A Perſon deliver'd to another a Sum of Money unknown, to receive Intereſt for the ſame, at 6 *per* Cent *per* Annum, ſimple Intereſt, and at the end of 10 Years receiv'd for Principal and Intereſt 300*l*. What was the Sum lent.

Suppoſe the Sum was 100l. to which add the 10 Years Intereſt at 6 *per* Cent. makes 160 *l*. Then ſay,

```
     l.       l.        l.           l.
If  160———100———300  Anſwer  187. 10, 0.
```

And ſo much was the Money firſt lent.

## *The donble Rule of Falſe.*

IS, when we make uſe of two ſuppoſitial, or feigned Number, to reſolve the Queſtion by.

When a Queſtion is propoſed belonging to this *Rule*, you may ſuppoſe one Number at Pleaſure, with which proceed, as with the true Number; if it anſwers the Queſtion, your Work is done; if not, note whether the Error be too much or too little, which place under the Suppoſition by it which it produced. Then again make the ſecond Suppoſition, with which Proceed as with the firſt, and place the Error proceeding, whether too great, or too little, under its Suppoſition; then multiply the firſt Suppoſition by the ſecond Error, and the ſecond Suppoſition by the firſt Error; aud if the Error be both of one Kind, that is, both too much, or both too little, then the Difference of the Products found by *Subtraction* is your Dividend, and the Difference of the Erors is the Diviſor, and the Quotient will be the Number required. But if the Error be of different Kinds, that is one too great, and the other too little, then take the Sum of the two Products for the Dividend, and divide it by the total Sum of the Errors, and the Quotient will be the Anſwer. According to this Verſe,

*Addito diſſimiles, ſubtrahitoque pares*——

Or thus, *When Errors are of unlike Kinds,*
Addition, *does enſue*;
*But when alike*, Subtraction *finds*
*dividing Work for you.*

Ex. 1. A Man hath two ſilver Cups of unequal Weight, having to them both one Cover, weighing 5 Ounces; now if the Cover be put upon the leſſer Cup, it will be in double Proportion to the weight of the greater Cup? and the Cover being ſet on the greater Cup it will be in tripple Proportion to the Weight of the leſſer. The Queſtion is, What is the Weight of each Cup?

7 X 9
10 15
——
90 105
96
——
5)15
——
*Oz.* 3.
——

To reſolve this, Suppoſe that the weight of the leſſer Cup is 7 Ounces, then this with the Cover will weigh 12 Ounces; and becauſe this ſhould be double the weight of the grater Cup the greater muſt weigh 6 Ounces; this added to the weight of the Cover, *viz.* 5, make 11 Ounces, which ſhould be three Times the weight of the leſſer Cup; Now 3 times 7 is 21, from which taking 11, I find 10 to be the firſt Error, too little, which I place under my Suppoſition 7, making a Croſs between them, as in the *Margin.*

Suppoſe again, That the leſſer Cup weigh 9 Ounces, and proceeding with this Suppoſition, as with the firſt, I find the ſecond error to be 15, to little, which being plac'd under the ſecond Suppoſition, as in the Margin; according to the Direction in the *Rule*, I muptiply 7, the firſt Suppoſition, by 15, the ſecond Error, and the Product is 105. Again, I multiply 9, the ſecond Suppoſition by 10, the firſt Error, and the Product is 90. And *laſtly*, Becauſe the Errors are of like Kind, *viz.* both too little, I ſubtract 90 from 105, And the Remainder is 15, which I divide by 5, the Difference of the Errors, and the Quotient is 3 the weight of the leſſer Cup. And to find the weight of the Greater, I add 5, the weight of the Cover, to 3 the weight of the leſſer Cup, and the Sum is 8 And becauſe by the Queſtion, the weight of the leſſer

Cup with the Cover, muſt be double the weight of the Greater, therefore half the weight of the leſſer Cup and Cover muſt be the weight of the Greater, which is 4 Ounces.

This I think ſufficient for a verbal Demonſtration of this *Rule*, and therefore ſhall only add one other *Example*.

*Ex.* 2. There was a Bricklayer oblig'd to build a Wall in 40 Days, and it was agreed, That every Day that he Work'd he ſhould have 2*s.* 1*d.* and every Day he play'd he ſhould forfeit $\frac{1}{2}$ Crown; ſo that when the Wall was finiſh'd, and the Reckoning made, the Bricklayer receiv'd but 5*s.* 5*d.* The Queſtion is, What number of Days he work'd, and how many he play'd? ——— Anſwer, He work'd 23, and play'd 17 Days.

## *FRACTIONS*, *Vulgar and Decimal*

HAVING in the preceeding Part of this Book ſufficiently treated of *Arithmetick in whole Numbers*, I come now to ſpeak of the *PARTS* or Fragments of Unity, call'd *FRACTIONS*; and this I ſhall do with plainneſs and brevity

*Definition* 1. *Fractions* are either *Vulgar* or *Decimal*.

2. A vulgar Fraction conſiſteth of two Parts, *viz.* a Numerator, and a Denominator. The Numerator ſtands above, and the Denominator below a ſmall line thus, $\left\{\frac{5}{6}\begin{matrix}\text{Numerator}\\ \text{Denominator}\end{matrix}\right\}$ and to be read five ſixth

and if Parts of a Pound, or 20 Shillings, it would expreſs, or ſignify, that if 20 Shillings were divided into 6 Parts, this Fraction would ſtand for 5 of thoſe 6 Parts; that is, 5 three and four pences, or 16*s.* 8*d.* The Numerator expreſſes the Number of Parts, and the Denominator giveth to thoſe Parts their Names

3. Vulgar Fractions are either Simple or Compound; a Simple Vulgar Fraction hath only one Numerator, and one Denominator, as, $\frac{3}{4}$, three Fourths, or three Quarters, and is either proper or improper; proper when the Numerator is leſs than the Denominator, as $\frac{3}{8}$, three Eights; improper, when the Numerator is greater than the Denominator, as, $\frac{8}{4}$, eights Fourths, which is two Integers; for eight Fourths of a Pound is 40*s.* or 2*l.* And if the Numerator and Denominator are equal, then the Fraction is equal to a whole Thing, as, $\frac{4}{4}$, four Fourths of a Penny is a Penny; and $\frac{5}{5}$ of an Ell is an Ell. And the Reaſon is plain, for the Integer contains juſt ſo many Parts as the Denominator expreſſes.

A Compound Fraction (or a Fraction of a Fraction) is, when an Integer is divided into Parts, and thoſe Parts ſubdivided into other Parts, and are expreſt with two or more Fractions with this *Particle* (of) betwixt them, as 3 Farthings may b thus expreſt, $\frac{3}{4}$ of $\frac{1}{12}$ of $\frac{1}{20}$ of a Pound; and 5 Pence $\frac{5}{12}$ of $\frac{1}{20}$ of a Pound *&c.*

5. When a whole Number hath a Fraction joined to it, then it is call'd a *Mixt Numbir*, as *l.* 4 $\frac{5}{8}$ is 4 Pounds $\frac{5}{8}$, or 4*l.* 12*s.* 6*d.*

*Reduction*

## REDUCTION,

REDUCTION of Vulgar Fractions is Two fold *viz.* into a common, or into the leaſt Denomination.

### I *To reduce Fractions of unequal Denominatiors into Fractions of equal Value, that ſhall have one common Denominator*

*Rule.*

Multiply each Numerator into all the Denominators except its own, and take the reſpective Products for new Numerators, then multiply all the Denominators continually, and the laſt Product thence ariſing ſhall be a new Denominator, common to all the Numerators found before.

*Example*, Reduce $\frac{2}{3}\frac{3}{4}\frac{5}{6}$ & $\frac{7}{8}$ of a Pound to a common Denominator.

Firſt, I ſay, 4 times 2 is 8, and 6 times 8 is 48, and times 48 is 384, for the firſt Fractions $\frac{2}{3}$, and ſo of the reſt, then I multiply the Denominators continually. ſaying 3 times 4 is 12, and 6 times 12 is 72, and 8 times 72 is 576, for the common Denominator, and being thus reduced, ſtand thus.

$\frac{384}{575}\ \frac{432}{576}\ \frac{480}{576}\ \frac{504}{576}$ or thus $\frac{384\ \ 432\ \ 480\ \ 504}{576}$

Note, That if you take away the common Denominator, then the Numerators are whole Numbers, and have the ſame Proportion that the given Fractions have.

The Reaſon of thus reducing Fractions, is to fit them for *Addition* and *Subſtraction*, &c. which otherwiſe cannot be done; but in Decimals there is no Occaſion for this *Reduction*, as I ſhall ſhew hereafter.

## II. *To abreviate or reduce a Fraction into its loweſt Terms.*

### *Rule*

Divide both Numerator and Denominator by ſuch a Number as divides both without any Remainder in either of them.

When the Numerator and Denominator are even Numbers, then they may be abreviated by halving them continually, or dividing them by 2, as $\frac{12}{28}$ may be reduc'd to $\frac{3}{7}$, thus

$$\frac{12}{28}\Big|\frac{6}{14}\Big|\frac{3}{7}$$

Here I ſay, the half of 12 is 6, and the half of 28 is 14, then the half of 6 is 3, and half of 14 is 7, as in the Example. Or you may reduce it ſooner, by dividing by any other Number that divides the Fraction without any Remainder as 4 brings $\frac{12}{28}$ into $\frac{3}{7}$ at once; the 4's in 12 3 times, and the 4's in 28 7 times

When you can no longer halve them, you may divide them by 3, 4, 5, 6, 7, 8, or 9, if they ſo divide as to leave no Remainder; and after you have divided by a great, you may yet divide by a leſſer Number, to reduce the Fraction ſtill lower.

Example, Reduce $\frac{84}{168}$ ito its loweſt Terms.

$2(\frac{84}{168} \mid \frac{42}{84} \mid 7)\frac{21}{42} \mid 3)\frac{3}{6} \mid \frac{1}{2}$ *Facit*

Here I firſt halve them. till I come to $\frac{21}{42}$ which I divide by 7, which brings $\frac{21}{42}$ to $\frac{3}{6}$ which reduced by 3, brings the Fraction to $\frac{1}{2}$, its loweſt Terms.

Ex. 3. Reduce $\frac{990}{1584}$

$2(\frac{990}{1584} \mid \frac{3}{3} \mid \frac{495}{792} \mid \frac{3}{3} \mid \frac{165}{264} \mid \frac{11}{11} \mid \frac{55}{88} \mid \frac{5}{8}$ Facit.

In this Example I abbreviate by 2, and then by 3, and again by 3, and laſtly by 11, as may be ſeen *per.* Work; ſo the Fraction $\frac{990}{1584}$, in its loweſt Terms is $\frac{5}{8}$, and is equal in Value with $\frac{990}{1584}$, and anſwers the ſame End in Operation, but in much fewer Figures, as I ſhall ſhew when I come to apply Fractions to their proper Uſes.

When the Numerator and Denominator end each with a Cypher or a 5, or one with a 5 and the other with a Cypher then 5 will ſerve for the common Diviſor to both

*Example*, Let $\frac{30}{45}$ be reduc'd to its loweſt Terms

$5)\frac{30}{45} \mid \frac{6}{9}$ *Facit.*

Again

Again abreviate $5)\frac{350}{465}$

*Facit* $\frac{50}{93}$

When there are Cyphers or a Cypher in the Numerator and Denominator, cut them off, and abreviate as before, and the Fraction ſhall have the ſame Value.

*Example*, Reduce $\frac{250}{450}$ thus,

$5 \mid \frac{25}{45} \mid \frac{0}{0} \mid \frac{5}{9}$ *Fac.* and $\frac{300}{400}$ makes $\frac{3}{4}$

## III. *To Reduce a Compound Fraction to a Simple One of the ſame Value.*

### *Rule.*

Multiply all the Numerators together for a new Numerator, and all the Denominators together for a new Denominator.

*Example*, Reduce $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{5}{6}$ of a Pound

Here I ſay, twice 3 is 6, and 5 times 6 is 30, for a Numerator, then 3 times 4 is 12 and 6 times 12 is 72, for the Denominator ſo that $\frac{30}{72}$ is equal with $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{5}{6}$ of a Pound which is 8 *s.* 4*d.*

*Example* 2, Reduce $\frac{6}{7}$ of $\frac{7}{8}$ of $\frac{9}{10}$ of a Hundred Weight.

*Facit* $\frac{378}{560}$

Here I ſay 6 times 7 is 42, and 9 times 42 is 378 for the Numerator then 7 times 8 is 56 and 10 times 56 is 560 for the Denominator, which Fraction $\frac{378}{560}$ of a Hundred Weight is 22 ℔ $\frac{1}{56}$

## IV. *To Reduce a Whole Number, into an Improper Fraction.*

### *Rule*

This is done, either by ſetting the propoſed whole Number for the Numerator and a Unit for the Denominator and the Product ſhall be the Numerator to the ſaid Denominator.

*Example*, Suppoſe 12 Integers were to be reduc'd to an Improper Fraction whoſe Denominator ſhall be 4; multiply 12 by 4, and the Product is 48, for the Numerator to be the Denominator, 4; ſo the Improper Fraction $\frac{48}{4}$ equal 12 Integers.

## V. *To Reduce a Mixt Number into an Improper Fraction.*

### *Rule*

Multiply the whole Number by the Denominator of the Fractional Part, and add or take in the Numerator.

*Example*, Reduce *l.* 15 $\frac{7}{8}$ to an Improper Fraction

$$\begin{array}{r} 15 \\ 8 \\ \hline \frac{127}{8} \end{array} \quad \textit{Facit}$$

Thus I multiply 15 the whole Number by 8, the Denominator of the Fractional Part, and take in 7 the Numerator, ſo $\frac{127}{8}$ is equal to the mixt Number 15 $\frac{7}{8}$.

*Ex.* 2. Reduce the mixt Number 124 $\frac{5}{8}$ to an Improper Fraction.

*Facit* $\frac{997}{8}$.

## VI. *To find the Value of a Fraction in the known Parts of the Integer.*

*Rule*

Multiply the Number of the next inferior Denomination, contain'd in the Interger, by the Numerator, and divide the Product by the Denominator.

*Ex.* 1. What is $\frac{3}{4}$ of a Pound, or 20 *s*?

$$\begin{array}{r} 3 \\ \hline 4)\ 60 \\ \hline 15 \end{array}$$

15 *s*. Anſwer.

Here I multiply the Integer 1 Pound in its next Inferior Denomination, *viz.* Shillings, being 20, by the Numerator 3 and it produces 60, which I divide by the Denominator 4, and it quotes 15 *s*. for tne Anſwer; ſo that 15 Shillings is equal to $\frac{3}{4}$ of a Pound.

Ex 2. What is $\frac{5}{6}$ of a Pound or 20 s. Anſ. 16*s*. 8*d*

$$\begin{array}{r} 5 \\ \hline 6)\ 100 \\ \hline \end{array}$$

16 *s*. $\frac{4}{6}$ or $\frac{2}{3}$ Anſ.

Here I multiply and divide as above directed, and there remains, 4, which ſet over 6 the Diviſor ſignifies $\frac{4}{6}$ of a Shilling, which is 8 *d.* and in its loweſt Terms it is $\frac{2}{3}$ of a Shilling, which is the ſame.

**Ex.** 3. What is $\frac{6}{16}$ of a Pound? Anſwer 7 *s.* 6 *d.* for 8 the Remainder is the half of 16 the Diviſor, and ſingifies half a Shilling, or Sixpence, as *per* Margin.

```
          20
           6
        ------s. d.
  6) 120 (7, 6,
     112
    ------
        8/16
```

*Ex.* 4. What is $\frac{3}{7}$ of a Hundred Weight?

```
     l.
    112
      3
   -----
7) 336
   -----
Anſwer, 48 l.
```

More Examples with their *Facits* for Practice.

Whas is $\frac{5}{7}$ of an Ell Engliſh?

```
          Nls.
           20
            5
         -----
      7)  100
         -----
Facit Nails 14 2/7
```

What is $\frac{6}{7}$ of a Pound Sterling?
Anſ. 17 *s.* 1 *d.* $\frac{16}{27}$
What is $\frac{7}{8}$ of a Shilling?
Anſ. 10 *d.* $\frac{1}{2}$

What is $\frac{6}{8}$ of 100 *l.* Sterling?
Anſ. 75 *l.*
What is $\frac{7}{10}$ of a Tun of Wine (252 Gallons being the Integer? )
Anſ. 176 Gall $\frac{4}{10}$
What is $\frac{12}{16}$ of a Tun Wt. Averdupois
Anſ. 15 C.
What is $\frac{2}{3}$ of a Foot?
What is $\frac{3}{4}$ of a Pound Averdupois?
Anſ. 12 Ounces.

*Rule.*

VII. If you would known what Part of a Pound any Shillings and Pence are, or what Part of a Tun any Quantity of Hundreds, Quarters and Pounds are, &c. bring them into the loweſt Name mentioned for Numerator, and likewiſe bring the Interger into the ſame Name for a Denominator, and then reduce the Fraction into its loweſt Terms by the 2d Rule of this Chapter

Example, What part of a Pound is 12 *s.* 6 *d*?

| | | | |
|---|---|---|---|
| | | 12 | |
| 20 *s.* | | | |
| 12 | Numerator | 15,0 | $\frac{5}{8}$ |
| 240 | Denominator | 240 | |

Here 12 *s.* 6 *d.* make 150 Pence, for the Numerator, and 240 Pence thoſe in a Pound the Denominator, which abreviated by 3 brings the Fraction to $\frac{5}{87}$ as in the Work.

## *ADDITION*

# ADDITION.

# OF

# *VULGAR FRACTIONS.*

1. IF the Fractions to be added have a common Denominator, then add all the Numerators together for a Numerator, and place it over the Common Denominator.

*Example*, What is $\frac{2}{8}$ $\frac{3}{8}$ $\frac{4}{8}$ and $\frac{5}{8}$ of a Pound? Here is 3 & 2 is 5, & 4 is 9, & 5 is 14, the Numerator, which ſet over the Denominator 8, makes the Improper Fraction, $\frac{14}{8}$ To find the Value of which divide the Numerator 14 by the Denominator 8, ſaying, the 8's in 14 1, and there remains 6 which ſet over the 8, ſignifies $\frac{6}{8}$ of a Pound. or 6 Half Crowns ſo the Value of the Improper Fraction $\frac{14}{8}$ is found to be 1 *l.* 15 *l.*

2. If the Fractions to be added have not a common Denominator, then they muſt be reduc'd to one, according to the 1ſt Rule of this Chapter.

For Example. Let $\frac{3}{4}$ be added $\frac{2}{3}$ $\frac{3}{5}$ $\frac{5}{7}$ & $\frac{7}{8}$ of a Pound together, it being the firſt Example of the abovementioned Rule. and being there reduc'd to a common Denominator. they ſtand thus $\frac{384}{576}$ $\frac{432}{576}$ $\frac{490}{576}$ and $\frac{504}{576}$, and the Numerators being added together they make 1800, which ſet over the common Denominator 576 conſtitute this Improper Fraction $\frac{1800}{576}$. which reduc'd as directed in the firſt Rule of this Chapter of *Addition*, it will be found to be 3*l.* $\frac{72}{576}$, which reduc'd to its loweſt Terms *per* 12 and 6. gives $\frac{1}{8}$ of a Pound, or Half a Crown ; ſo theſe Fractions added together make 3l. 2*s.* 6*d.*

---

# SUBSTRACTION

# OF

# VULGAR FRACTIONS

As in Addition, if the Fractions are of unequal Denominators they muſt be reduc'd to a common Denominator, before *Subſtraction* can be made then ſubtract one Numerator from the other, and ſet the Difference over the common Denominator.

*Example*, Subtract $\frac{16}{24}$ of a Pound from $\frac{21}{24}$

*Facit* $\frac{5}{24}$, for 16 the firſt Numerator, from 21 the ſecond, reſt 5 which plac'd over the common Denominator 24, make $\frac{5}{24}$ for the Difference, or 4*s.* 2*d*

Ex. 2. From $\frac{7}{8}$ of any thing take $\frac{3}{8}$, and there reſts $\frac{4}{8}$ or $\frac{1}{2}$.

## II. *To Subſtract a Fraction from a whole Number.*

### Rule

Subſtract the Numerator from the Denominator, and the Remainder place over the given Denominator, and take a Unit from the whole Number for what you borrow'd, and the remainder place before the Fraction found, which mixt Number ſhall be the Difference ſought.

Example, Take $\frac{6}{9}$ from 25*l.* Say, 6 from 9 and there reſts 3, which place over 9 thus $\frac{3}{9}$, then 1 from 25 and there reſts 24; ſo the Remainder is $24\frac{3}{9}$.

## III. *To Subſtract a mixt Number from a whole Number*

### Rule

From the Denominator of the Fraction take the Numerator, and ſet the Remainder over the Denominator, and take 1 from the whole Number.

Example, Take 5*s.* $\frac{3}{8}$ from 12*s.* Say, 3 from 8 and there reſts 5, and ſet it over 8 thus $\frac{5}{8}$, then 1 and 5 is 6 from 12, and there remains 6; ſo the Difference is 6*s.* $\frac{5}{8}$, or 6*s.* 7*d.* $\frac{1}{2}$.

Ex. 2. Ells

From 24

Take $19\frac{3}{5}$.

Ells $4\frac{2}{5}$ Anſwer.

IV.

### IV. *To Subſtract a mixt Number from a mixt number*

*Rule.*

Take the leſſer Numerator from the greater, &c.

Example Take 23 *l.* $\frac{5}{8}$ from 37 *l.* $\frac{7}{8}$

$$\begin{array}{rl} & 37\ \frac{7}{8} \\ & 23\ \frac{5}{8} \\ \hline \text{Anſwer} & 14\ \frac{2}{8} \end{array}$$

### V. *To take a Greater Fraction from a Leſſer.*

Rule

Take the Numerator of the Greater Fraction from its Denominator, and put the Remainder to the Numerator of the Leſſer Fraction, which is borrowing an Integer, &c.

Example, Take 24 C. $\frac{12}{16}$ from 35 $\frac{7}{16}$

$$\begin{array}{rl} & 35\ \frac{7}{16} \\ & 24\ \frac{12}{16} \\ \hline & \text{C qrs. lb.} \\ \text{Anſ. C.} & 10\ \frac{11}{16} \text{ or } 10, 2, 21 \end{array}$$

---

## MULTIPLICATION

## OF

## VULGAR FRACTIONS.

*Rule* I. IF the Fractions to be multiplied be ſimple Fractions, then multiply all the Numerators continually for a new Numerator, and all the Denomiminators together for a new Denominator, and that new **Fraction** gives the Product.

Example. multiply $\frac{2}{3}$ of a Pound by $\frac{3}{4}$ of a Pound. Here twice 3 is 6, and 3 times 4 is 12; ſo $\frac{6}{12}$ or $\frac{1}{2}$ is the Product of $\frac{2}{3}$ multiplied by $\frac{3}{4}$ of a Pound.

Here may be noted that Multiplication in Fractions leſſens the Product, whereas it is increaſed in whole Numbers.

Ex. 2 Multply $\frac{7}{8}$ of a Pound *per* $\frac{9}{10}$ *Fac.* $\frac{63}{80}$

*Rule* II When a compound Fraction is to be multiplied by a ſimple one. reduce the compound Fraction into a ſimple one, and then work as before.

Example, Multiply $\frac{3}{8}$ of a Pound by $\frac{5}{8}$ of $\frac{3}{4}$ The compound Fraction reduc'd to a ſimple one makes $\frac{15}{32}$, which multiplied by $\frac{3}{8}$ makes $\frac{45}{256}$ for the Anſ. being 3*s.* 6 $\frac{48}{256}$

Rule III. *To multiply mixt numbers by mixt Numbers.*

Multiply 2*s.* $\frac{1}{3}$ by 1*s.* $\frac{2}{4}$: Theſe being reduc'd Simple to Simple Fractions according to the Rule, make $\frac{7}{3}$ and $\frac{6}{4}$, which multiplied according to the Firſt Rule of this Chapter, make $\frac{42}{12}$, which improper Fraction being reduc'd to a mixt Number, according to the Rule in *Reduction*, gives 3*s.* $\frac{6}{12}$, or 3*s.* 6*d.* for the Anſwer; ſo that 2*s.* 4*d.* multiplied by 1*s.* 6*d* produces 3*s.* 6*d.* *Note*, that mixt Numbers muſt be brought into improper Fractions as above &c.

*Rule* IV. When a mixt Number is to be multiplied by a Fraction, reduce the mixt Number into an Improper Fraction. and work as before.

*Example*, Multiply 4 *l.* $\frac{3}{8}$ by $\frac{4}{12}$ of a Pound.

$$\begin{array}{ll} 8 & \\ \hline \frac{35}{8} & \qquad \frac{140}{96} \text{ fac.} \end{array}$$

Here I ſay 8 times 4 is 32, and 3 taken in makes $\frac{35}{8}$, then 4 times 35 is 140, and 12 times 8 is 96. This Example is *4l. 7s. 6d.* multiplied by *6 s. 8 d.* which if reduced as above, gives 1*l.* 9*s.* 2*d.* for the Product

Multiply 19 *l.* $\frac{4}{5}$ by 27*l.* $\frac{7}{8}$

*Facit* $\frac{22077}{40}$ or 551*l.* 15*s.*

This Example is 27*l* 17*s.* 6*d.* multiplied by 19*l.* 16*s*

Rule V. *To take any Part or Parts of a Number.*

MUltiply the Number by the Fraction expreſſing the Part or Parts, and the Product gives the Part deſired.

Ex. 1. What is $\frac{1}{6}$ of 54*l.*

*Facit* $\frac{54}{6}$ or, 9*l.*

Ex. 2. What is $\frac{3}{8}$ of 144 Gallons?

*Facit* $\frac{432}{8}$ or 54 Gallons.

---

# DIVISION

## VULGAR FRACTIONS

1. IF the Fractions to be divided be ſingle Fractions and have a common Denominator, then divide one Numerator by the other, and place the Quotient over the common Denominator.

*Ex.* 1. Divide $\frac{4}{16}$ *per* $\frac{2}{16}$. *Facit* $\frac{2}{16}$.

*Ex.* 2. Divide $\frac{24}{68}$ *per* $\frac{7}{68}$. *Facit* $\frac{4}{68}$.

2. If the Numerators be not ſingle Fractions, then they muſt be reduc'd to ſingle Fractions with common Denominators, and then divided as above.

*Example.* Divide 2*l.* $\frac{2}{3}$ by 1*l.* $\frac{1}{5}$ which ~~being~~ reduced make $\frac{7}{3}$ & $\frac{6}{5}$, which reduced to a common Denominator, and divided as above, quotes 2l. , $\frac{4}{8}$.

*Note*, That in *Diviſion* of proper Fractions, when the Diviſor is leſs than an Unit, the Quotient is always greater than the Dividend.

Or the Example above, *viz.* $\frac{8}{3}$ and $\frac{7}{5}$ (being ſingle Fractions) may be divided, reducing them to a common Denominator, thus, multiply the Numerator of the Dividend into the Denominator of the Diviſor, and the Product is a new Numerator, alſo multiply the Denominator of the Dividend by the Numerator of the Diviſor, and the Product is a new Denominator which Fraction is the Quotient ($\frac{8}{6}$ & $\frac{3}{5}$) thus 5 times 8 is 40 the Numerator, and 6 times 3 is 18 the Denominatior, and make the Fraction $\frac{40}{18}$

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# Of Decimal Fractions.

1. A Decimal Fraction is an artificial Way of expreſſing a Vulgar Fraction by ſetting down the Numerator only, the Denominator being underſtood, which is always an Unit with as many Cyphers annexed, as there are Places in the Numerator, and therefore muſt be either 10, 100, 1000 10000, 100000, &c.

2. A Decimal Fraction is diſtinguiſhed from a whole Number by having a Comma or Point prefix'd before it thus; 5 and ſignifies 5 Tenths of a Unit, whereas without the Point before it, it would be 5 Units For the better Underſtanding this 2d Definition, and to know kow Vulgar Fractions are expreſs'd by Decimals, obſerve the following Notes of Diſtinction, *viz.*

| Vulg. | | Decimally |
|---|---|---|
| $\frac{5}{10}$ | expreſs'd | ,5 Five Tenths or a Half |
| $\frac{25}{100}$ | | ,25 Hundredths or a quart. |
| $\frac{75}{100}$ | | ,75 Hundredths or Three |
| $\frac{246}{1000}$ | | ,46 Thouſandths (Quarters |
| $\frac{6}{100}$ | | ,06 Six Hundredths |
| $\frac{64}{10000}$ | | ,0064 Ten Thouſands |

3. As a whole Number increaſes by a Ten fold Proportion from the Units Place to the Left-hand, ſo Decimals decreaſe in the ſame Proportion, from Unity to the Right-hand, as may be obſerv'd by the following Table.

| C's of Millions | X's of Millions | Millions | C's of Thouſand | X's of Thouſand | Thouſands | Hundreds | Tens | | Primes | Seconds | Thirds | Fourths | Fifths | Sixths | Sevenths | Eights |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

A B

The Table A ſignifies Intergers, and the Table B Parts of Intergers, thus the Figure 2 in the Table A ſignifies 2 Tens, or twice 10 Units, but the Fignre 2 in the Table B ſignifies but 2 Primes or 2 Tenths of Unity; ſo 3 in the Table A is Three Hundreds, but in the Table B 3 ſtands for 3 Seconds, or Three Hundred Parts of Unity, *&c.*

Cyphers before Integers and after Decimals, have no Value; but after Integers and before Decimals they have, for though they ſignify nothing of themſelves (as was ſaid in the Chapter of *Numeration)* yet in Integers they augment, and in Decimals they diminiſh the Value of the other Figures; for 06 in whole Numbers is but 6, and 006 is no more, but in Decimals, by perfixing a Comma before it thus ,6 is decreaſed from 6 to Six Tenths of a Unit, and with a Cypher and Comma before it thus ,06 to Six Hundred Parts of a Unit, *&c.* but a Cypher or Cyphers on the Right-hand of 6 ſignifies 60, in Decimals, but Six Tenths, and if 2 or more thus 600, be annext, yet ſtill it is no more, *&c*

This Sort of *Arithmetick* addeth, ſubſtracteth multiplyeth, and divideth whole Numbers and Fractions together and gives their Totals, Remainders, Products, and Quotients in whole Numbers and Fractions, without the Help of *Reduction*.

Before I ſpeak of *Addition* of Decimals, tis neceſſary to ſhew how to reduce a Vulgar Fraction into a Decimal.

*Rule*—— Annex 1, 2, 3or more Cyphers at Diſcretion to the Numerator, and divide by the Denominator, and the Quotient is the Decimal required, and the ſame Value with the Vulgar Fraction, or Infinitely near, as the 1000000 Part of a Farthing, a Dram; o a Grain, *&c.*

*Ex*

*Example*, What is $\frac{1}{4}$ of any Thing reduc'd to a Decimal?

4) 100

,35 Anſwer.

*Ex.* 2. Reduce $\frac{3}{4}$ of any thing to a Decimal

4) 3000

,75 *Facit*

What is the Decimal of 12 *s.* $\frac{12}{20}$? $\frac{12}{20}$00),6 Anſwer
What is the Decimal of 17 *s.* $\frac{17}{20}$0),85 Anſ.
What Decimal of 1 C. Wt. is 84*l.* $\frac{84}{112}$00(,75*l.* Anſ

Thus any Number of Shillings, Pence, Ounces *&c.* are reduc'd into Decimal Fractions, by dividing *per* their Integers (after a competent Number of Cyphers are annex'd, 5 or 6 at the moſt generally being enough) *viz.* Shillings, *per* 20, Pence 240, Farthings *per* 960, Ounces, *Avoirdupois* and *Troy*; *per* 16 and 12 Hours *per* 24, Days *per* 365, *&c.*

| | | | |
|---|---|---|---|
| So | 15 *s.* | is | ,75 |
| | 16, 8 *d.* | | ,833. |
| | 3 *Oz. Troy* | | ,25. |
| | 9 *Oz. Avoirdupois.* | | ,5625. |

---

## *Addition and Subſtraction* OF DECIMALS.

A*Ddition* and *Sdbſtraction* of Decimals differs not from that of whole Numbers, in the Work, but Regard muſt be had in placing the Numbers properly under one another *viz.* the whole Numbers muſt ſtand under one another, as in whole Numbers, Units under Units, &*c.* and the Decimal or Fractional Part [if it be a Number] muſt ſtand thus, Primes under Primes, Seconds under Seconds &*c.* and then being at the Right-hand as in whole Numbers, and for every 10 carry or borrow, 1, as there alſo; &*c. Note*, you muſt make the Comma's or Points of Separation, to diſtinguiſh the whole Numbers from the Fractions.

## EXAMPLES.

| Decimals | Int. | Parts | | | s. d. |
|---|---|---|---|---|---|
| ,473 | 25 | ,5 | ,333 | | 6, 8 |
| ,024 | 7 | ,75 | ,25 | | 5, 0 |
| ,75 | 27 | ,046 | ,75 | equal | 5, 0 |
| ,076 | 9 | ,7246 | ,003 | to | 0, 0 $\frac{3}{4}$ |
| ,245 | 4 | ,5 | ,3 | | 6, 0 |
| ,7 | 36 | ,0024 | ,666 | | 13, 4 |
| 2. 261. | 110 | ,5230. | *l.* 2, 302. | | *l.* 2, 6, 0, $\frac{3}{4}$ |

Note, You Point-off as many Figures for Decimal Parts as there are in the greater Number.

The Firſt of theſe Examples is 2 Integers and ,268 Decimal Parts; the Second 110 Integers and ,5230; and the laſt 2 and ,302 Parts or *l.* 2, 6, 0, $\frac{3}{4}$

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## SUBSTRACTION.

| | | | |
|---|---|---|---|
| ,44706 | ,86503 | 4 ,722 | 36 ,272 |
| ,17224 | ,05913 | 1 ,987 | 19 ,5 |
| ,27412 | ,80520 | 2 ,742 | 16 ,772 |

# *MULTIPLICATION*

# OF

# *DECIMALS*

MULTIPLICATION of Decimals is the ſame in Operation as in Integers: only when the Work is done you muſt point off towards the right hand as many Figures or Cyphers as there are decimal Places in both the multiplier and multiplicand, and thoſe Figures towards the left-hand are Integers, and thoſe pointed off to the right are decimals Parts

*Example*

Multiply ,666 by ,666 or 13*s.* 4*d.* by 13*s.* 4*d.*

```
    ,666
  --------
    3996
   3996
  3996
  --------
  ,443556
```

Multiply *l.* 45 ,75
By ,25

22875
9150

11, 4375

Anſ. 11 Int & ,4375 Parts

,0053
,12

,000636

,64
8

512

4, 64
,93

1392
4176

4,3152

5, 32
,48

4256
2128

2,5536

If when after Multiplication there are not ſo many Places to point off, as there are Fractional Places in both the Factors, then ſuch Defect muſt be ſupplied by Cyphers, as above.

# DIVISION
# OF
# DECIMALS.

DIVISION, whether in entire Decimals, or in Integers and Decimals, the Operation is the ſame as in whole Numbers ; but Regard muſt be had to denominate the Quotient, which may be done by this Rule *viz.* The firſt Figure of the Quotient will be of the ſame Degree, Place or Denomination with that Figure or Cypher in the Dividend, which ſtandeth over the Place of Units in the Diviſor.

*Example*, Divide. 3658 by 25, explain the Value of the Quotient the Work performed as in the Integers. The Quotient is (after two Cyphers annext) 14632 to find the Value ſubſcribe the diviſor under the Dividend, and if the Units Place in the Diviſor ſtands under the Units Place in the Dividual, as *per* Margin

0, 25(0,3658 (1, 4632
02500

Note, There muſt be as many Decimal Places in the Diviſor and Quotient, as there are in the Dividend, if not the Defect muſt be ſupplied by Cyphers annext to the Left-hand of the Quotient, and is the reverſe of *Multiplication*.

When the Diviſor conſiſts of more Places than the Dividend, then a compent Number of Cyphers muſt be annexed to the Dividend, before Diviſion can be made.

*Example*, Divide 75 by 375, here I muſt annex two or more Cyphers to the Dividend 75, thus 7500 before I can work as uſual. 375) 7500(,20 or 2 Tenths
750

Divide 12,666003 by, 625)12,666003(20,265 Anſ

Divide 48.000 by 12,5 ) 48,000(3,84 Anſwer

Divide 8,750 by 5,5) 8750( 1,59 Anſwer.

The

# MENSURATION
# OF
# PLAINS *and* SOLIDS.

MENSURATION conſiſteth of two Parts *viz*. Superficial and Solid Meaſure.

1ſt. Superficial which reſpects Length & Breadth
2dly. Solid which reſpects Length, Breadth and Depth

| | | | |
|---|---|---|---|
| Diviſors | 144 | in a | Superficial Foot Square |
| | 1728 | | Solid Foot |

To the firſt of theſe Meaſures, *viz*. Superficial belong the Meaſuring of all Surfaces, or Flat Meaſure, Such as Board, Glaſs, Pavement Wainſcot Tyling &c.

To the Latter belong the Meaſuring of Timber Round, and Square, Stone, Brickwork and Digging &c.

## A General Rule for Superficial Meaſure

Multiply the Length in Inches by the Breadth in Inches and divide by 144, the Superficial Inches in a Foot Square, as before.

*Ex.* 1. Suppoſe a Shuffle-Board-Table to be 24 Foot 9 Inches long, and 5 Foot 3 Inches Broad, how many Superficial Square Feet, doth it contain?

| F. I. | F. I. | Inch |
|---|---|---|
| 24 9 Length | 5, 3 Breath | 297 Length |
| 12 | 12 | 63 Breadth |
| 297 | 63 | 891 |
| | | 1782 |

Ft. Inch.
144) 18711 (129, 11, $\frac{1}{4}$ Anſ.

*Note*, That the ſquaring any Number is Multiplying them into one another as above, Multiplying 297 Inches by 63 Inches produces 18711 Inches Square.

Another very Uſeful and Exact way is by Croſs Multiplication now Principally made Uſe of; which is as followeth.

Suppoſe a Table be in Length 24 Feet 9 Inches and in Breadth 5 Feet 3 Inches, what Number of Feet is contain'd therein?

F. I.
24 9
5 3

120 0
6 0
3 9
2 $\frac{3}{12}$

Anſ. 129 11 $\frac{1}{4}$

Firſt, I multiply the whole Numbers 24 Feet and 5 Feet together, and they make 120 Feet, then I multiply 24 Croſs ways, (from whence the Work hath its Name) and it produces 72, which divided by 12 gives 6 Foot, then I multiply 5 Foot Croſs ways by 9 which makes 45, which alſo divided *per* 12 gives 3 Foot 9 Inches; Laſtly I multiply the Inches together *viz.* 9 *per* 3 which produces 27 which likewiſe divided by 12 quotes 2 Inches $\frac{3}{12}$ or $\frac{1}{4}$ as in the Work.

And by this may all Numbers conſiſting of Feet and Inches be Meaſured whether in Carpenters, Joyners, or Maſons-Work, and is cheifly to be preferr'd

## Menſuration of Solids

SUch as Timber Stone, Liquids, &c. theſe are meaſured by the Cubical Foot of 1728 Solid ſquare Inches.

*Note*, A Cube is a Solid, whoſe Length, Breadth and Depth, are equal and is in Form of a Dye, of 6 equal Sides, and contains 12 Inches ſquare on each Side, making 1728 Inches.

## *To find the Solid Content of any Thing.*

### Rule.

Multiply the Length and Breadth together and then that product multiply by the Depth which laſt product divide by 1728 and the Quotient gives the content in Solid Feet for Timber or Stone. But in Liquids as Beer you muſt divide by 282, an for Wine by 231 which are the Cubical Inches, contain'd in a Beer and Wine Gallon.

Ex. 1ſt. Admit a Piece of Timber be 20 Foot 8 Inches Long 2 foot 5 Broad and 2 Foot Thick, I Demand the Solid Feet contain'd therein?

20, 8
2 5

40 0
8 4
1 4
$3\frac{2}{6}$

49 $11\frac{2}{6}$
2

Foot 99 $10\frac{4}{6}$ Anſwer,

Havi

## *Having the Breadth and Depth of a Piece of Timber, to know how much in Length will make a Foot Solid.*

Rule

Multiply the Breadth and Depth together, and let the Product be Diviſor to 1728, and the Quotient gives the Anſwer.

Ex. 2 If a Piece of Timber be 9 Inches Broad, and 8, Inches Deep, how much in Length will make a Foot Solid?

9 Inches Bread
8 Inches Deep
72 1728 24 Inches Length

If a Piece of Timber be irregular then girt i or take its Demenſions at ſeveral Places, and ad them together, and proceed as directed in Boar Meaſure only you divide by 1728 inſtead of 144

*Ex* 3. Suppoſe a Stone be 5 foot long 3 foot broad, and 2 foot deep, what is the Content?
Anſ. 30 ft. as *per* Margin.

f.
5 long
3 broad
———
15
2 ft. dp.
———
30 Anſ.
———

To know how many ſquare Inches are in a Tun, multiply 1728 by 40 and in a Load multiply the ſame by 50.

How many inches in a Yard ſquare, ſolid Meaſure is uſed in Digging?

36
36
216
108
1296
36
7776
3888
Anſ. 46656

If a Cord of Wood be 8 f. long, 4 foot high, & 4 foot br- how many foot doth it contain?
Anſ. 128 foot

8
4
32
4
128

If a Cord of Wood be 14 f. long 3 ſt. high, & 3 ft. broad how many feet?
Anſ. 128 Foot

14
3
42
3
126

If I borrow a Piece of Timber that's 4 foot ſquare and pay it again by 2 Pieces of 2 foot ſquare each, I deſire to know whether I pay as much Timber as I borrow?

4
4
16
4
64 ft. borrowed

2
2
4
2
8
2
16 Paid

By the Work it is plain that there is but $\frac{1}{4}$ Part paid, for the borrowed Piece contains 64 foot and the 2 Pieces paid make but 16 foot.

# Bricklayers-Work.

Tyling is meaſured by the ſquare of 10 ft as the Carpenters Work of roofing and flooring

If a Piece of Tyling be 25 foot broad, and 48 long, how many ſquares?

I here divide by 100 (for 10 times 10 is 100) which is done only by cutting off 2 Figures towards the Right-hand, and thoſe toward the Left are ſquares.

48 foot long
25 footbroad

240
96

12,00 Anſ. 12 Squares.

If Tyles lie 3 Inches out, then 800 covers one Square, but if 3 Inches and a half out, then 750 will do it.

| | |
|---|---|
| 800 | 750 |
| 12 ſquares | 12 ſquares |
| 9600 | 9000 covers the Roof of 12 ſquares |

Tiles ought to be 10 inches ½ in Length, and 6 in breadth, and weigh about 2 ℔ ½. Ridge Tiles are about 14 Inches long

Brickwork is meaſured by the Rod ſquare of 16 foot $\frac{1}{2}$ which makes (multiplied into it ſelf) 272 foot $\frac{1}{4}$ but the $\frac{1}{4}$ is neglected, and only 272 is the Diviſor.

foot
$16\frac{1}{2}$
$16\frac{1}{2}$
256
8
8
$272\frac{1}{4}$

A Brick ought to be 9 inches long 4 Inches $\frac{1}{2}$ broad and 2 $\frac{1}{4}$ thick

500 of Bricks
1000 of Pantiles } is a Load

Paving Tiles are 6, 8, 9, 10 and 12 inches ſquare

Suppoſe 4500 of Bricks make a Rod ſquare of Wall 13 Inches or a Brick and half thick, how many will build a Houſe 3 Rod High, and 12 Rods, in Compaſs?

Anſw. 162000 Bricks in all.

| | |
|---|---|
| 3 high | 4500 |
| 12 | 36 |
| 36 | 2700 |
| | 13500 |
| | Anſw. 162000 |

If a Wall be in Length 120 Foot, and 13 foot 3 inches high, what's the Content in Rods ſquare?

120,0
34

---

360,0
4

---

1440,0
120,0
30,0

---

272) 1590,0(5Rods $\frac{230}{272}$, or $\frac{3}{4}$ & half Quarter of a Rod
1360

---

230

Having meaſur'd the Face of the Wall, or Houſe on the out ſide thereof, then meaſure the End thereof on the Inſide, and make Deduction for the Doors and Windows.

But if the Wall be either thicker or thinner than a Brick and $\frac{1}{2}$ it muſt be reduced to *Standard* Meaſure, and that is, to one Brick and half by this Rule, *viz*.

Multiply the Number of Feet meaſur'd on the Face of the Work, by the Number of half Bricks the Wall hath in thickneſs, and $\frac{1}{3}$ Part of the Product gives the Number of Feet that is in the Wall, which reduce into Rods by dividing by 272, the Feet in a Rod ſquare.

**Example** Suppoſe the Face of a Wall to meaſure 4085 Foot and the Thickneſs of the Wall to be 2 Bricks & ½, or 5 half bricks, how many Rods doth it contain? Anſ. 25 Rods, as *per* Margin.

4085
5

$\frac{1}{3}$) 20425

272)6808)25 Rods
544·

1368
1360

(8)

# Digging,

Digging is meaſur'd by the Solid Yard of 27 Foot

*Example*, If a Pit be 18 Foot broad, and 8 Foot deep and 20 foot long, how many ſolid Yards? Anſ. 106 Yards ½ as in the Work.

F
18 broad
8 deep

144
20 long

27) 2880) 106 $\frac{88}{57}$ or $\frac{2}{13}$
27·

180
162

(18)

*Note*, A Yard ſquare of Clay makes about 7 or 800 of Bricks. The Price of making is about 6 or 7 *s. per* Million.

By this Method the Digging of Cellars, Vaults, &c are calculated.

Thus I have given Hints concerning Meaſuring, which I hope may be of good Uſe to the Ingenious, tho' much more might be ſaid, and more Examples given with ſeveral Geometrical Figures drawn which would ſwell this Book beyond its intended Limits.

## A few ſhort and eaſy Inſtructions for Tradeſmen, and others, to Stare and Keep their Books of Accompts, by Way of Debtor and Creditor, after the Italian Manner

*The Books Proper are Caſh-Book, Day-Book, or Journal, and Poſting-Book or Leidger.*

18 JU 70

*Firſt*, If you deſign to proceed regularly, you muſt make an Inventory, an Example of which is at the End of theſe Inſtructions.

Next you muſt Poſt it on your Poſting Book, *viz*
Merchandize to the Debit of that Accompt
Caſh in Hand to the Debit of your Caſh-Book.

*Robt Johnſon*, to the Debit of his Accompt.
*John Simpſon*, to the Debit of his Accompt
And for the whole Sum (*VIZ. l.* 570) you muſt give Counterpart in Credit of Stock.

To the Credit of *Thomas Hunt* the Sum you owe him.

To the Credit of *Richard Goodman* the Sum you owe him.

And for the whole Sum (*VIZ l.* 70) you muſt Debit Stock.

For Goods Sold you muſt put to the Debit Side of the Perſons to whom Sold, and Counterpart muſt be given for the whole Sum of this Page (*viz*) on Credit of Merchandize in the ſaid Poſting-Book and in like manner in every other Page of the ſaid Book.

Note, That the ready Money taken for Goods Sold, is Poſted each Month to the Debit of your Caſh-Book, and from thence to the Credit Side on your Poſting Book, and on the contrary for Money Paid, obſerving to make uſe of the Word, To, for Money Receiv'd or Goods Sold. And By, for Money Paid, *&c.*

To Ballance your Poſting-Book, Value you Merchandize remaining Unſold, and enter the Sum of their Value on Credit of the Accompt of Merchandize, and give Counterpart in Debit of the Accompt of Ballance in the Book: Which done Subſtract the Debit Side, of the ſaid Accompt from its Credit and place the Remainder, on the Debit ſide, and give Counterpart on Credit of Profit, and Loſs in the Poſting-Book.

In like manner muſt you do with the Accompt of Caſh, and with any other Accompts as you'll find in the Books following.

Laſtly, To Ballance your Accompt of Stock Subtract its Debit from its Credit, and ſet the Remainder (which is your Neat Stock) on the Debit of Stock and give counterpart in Credit of Ballance. This done your Poſt-Book is Ballanc'd, and the Account of Ballance if you have proceeded right will be equal on both Sides

# THE INVENTORY,

## *Auguſt* 1ſt. 1729.

THE Value of my preſent Stock } is *l.* 300 00 00
My Caſh in Hand——— is *l.* 180 00 00

What I have Owing,
*Richard Johnſon*, owes me, —— *l.* 50 00 00
*John Simpſon* ———— ——— l. 40 00 00

*l.* 570 00 00

18 JU 70

To whom I am Indebted
*Thomas Hnnt* ——— l. 30 00 00
*Richard Goodwin*, —— *l.* 40 00 00

—— —— *l.* 70 00 00
My Net Stock —— *l.* 500 00 00

# A
# BOOK
# OF
# *Receipts* and *Payments*
Otherwiſe call'd
# CASH-BOOK.

| 1729 | 1. Cash —— Debtor | F. | *l.* | *s.* | *d.* |
|---|---|---|---|---|---|
| | *August*, 1729. | | | | |
| 1 | To Stock *per* Inventory | 1 | 180 | 00 | 00 |
| 6 | Receiv'd of *Ralph Wilson* | 3 | 6 | 00 | 00 |
| 10 | *Mark Noble* ditto | 3 | 1 | 10 | 00 |
| 14 | *John Rich* ditto | 3 | 12 | 00 | 00 |
| 20 | *Richard Tims* ditto | 3 | 1 | 10 | 00 |
| 25 | *Henry Swift* ditto full | 4 | 14 | 14 | 00 |
| 31 | Goods Sold for ready Money | — | 30 | 10 | 00 |
| | *l.* 66 04 00 Received | | 246 | 4 | |
| | *September*, 1729 | | | | |
| | To ballance from laſt Month | | 211 | 09 | 00 |
| 16 | Rec'd of *Samuel Jackſon*. | 4 | 8 | 00 | 00 |
| 18 | *David Stout* ditto | 4 | 10 | 00 | 00 |
| 19 | *Richard Johnſon* ditto | 2 | 20 | 00 | 00 |
| 20 | *John Simpſon* ditto | [illegible] | 20 | 00 | 00 |
| 24 | *Edward Smith* ditto | 4 | 30 | 00 | 00 |
| 26 | *Robert Johnſon* ditto | 4 | 3 | 00 | 00 |
| 27 | *Ralph Wilſon* ditto | 3 | 10 | 00 | 00 |
| 28 | *Mark Noble* ditto | 3 | 9 | 00 | 00 |
| 2 | *Edward Smith* ditto | 4 | 1 | 00 | 00 |
| 30 | Goods Sold for ready Money | | 50 | 00 | 00 |
| | *l.* 160 09 00 Received | | 372 | 13 | 00 |

| | | F. | l. | s. | d. |
|---|---|---|---|---|---|
| | 1.<br>Caſh Creditor | | | | |
| | *Auguſt* 1729. | | | | |
| 10 | By Caſh Paid *Thomas Hunt,* | 2 | 15 | 00 | 00 |
| 31 | By ditto *Richard Goodwin,* | | 20 | 00 | 00 |
| | paid this Month | | 35 | 00 | 00 |
| | Due to Ballance | | 211 | 4 | 00 |
| | | | 246 | 04 | 00 |
| | *September* 1729. | | | | |
| 15 | By Caſh paid *Thomas Hunt* | 2 | 10 | 00 | 00 |
| 11 | By ditto paid *Richard Goodwiu* | | 10 | 00 | 00 |
| 30 | By Expences ſince *Auguſt* 1ſt | | 40 | 10 | 00 |
| | paid this Month | | 60 | 10 | 00 |
| | due to Ballance | | 312 | 3 | 00 |
| | | l. | 372 | 13 | |

The

# THE
# DAY-BOOK

| 1729 | Day-Book Page 1. | | *l.* | *s.* | *d.* |
|---|---|---|---|---|---|
| | Accompts Debtor to Goods Sold | | | | |
| | *Auguſt* 1. | | | | |
| 3 | *Ralph Wilſon* Debtor | | | | |
| | 6 yds Cloth at 18 *s.* —— | *l.* 5 8 0 | | | |
| | 4 yds ditto at 16 *s.* —— | *l.* 3 4 0 | 8 | 12 | 00 |
| 3 | *Mark Noble* Debtor to Goods | | | | |
| | 10 yds Callicoe at 2 *s.* 4 *d.* | 1 3 4 | | | |
| | 6 ditto —— at 2 — 6 | 0 15 0 | 1 | 18 | 04 |
| | 3*d* ditto | | | | |
| | *John Rich* Debtor | | | | |
| 3 | 1 Hhd. Tobacco | *l.* 10 10 00 | | | |
| | 1 Hhd. Sugar | *l.* 08 0 0 | 18 | 10 | 00 |
| | 10 ditto | | | | |
| | *Richard Tims* Debtor | | | | |
| 3 | 10 *l.* Pepper at 2 *s.* 4 *d.* | *l.* 1 3 4 | | | |
| | 6 ditto at 2 *s.* 4 *d.* —— | *l.* 0 14 0 | 1 | 17 | 4 |
| | | Goods Sold | 30 | 17 | 08 |

Day-

| 1729 | Day-Book Page 2. | *l.* | *s.* | *d.* |
|---|---|---|---|---|
| | *August* 20th | | | |
| 4 | *Henry Swift* Debtor to Goods | | | |
| | 1 barrel Raiſins ——— *l.* 08 10 00 | | | |
| | 1 ditto ——— ——— *l.* 06 04 00 | 14 | 14 | 00 |
| | 31 ditto | | | |
| 4 | Rec'd ready Money for Goods Sold | 30 | 00 | 00 |
| | *September* 6th | | | |
| 4 | *Samuel Jackſon*, Debtor to ditto | | | |
| | 60 yds Serge 2 *s.* ——— *l.* 06 00 00 | | | |
| | 14 ditto Cambl. 3 *s* 6 *d.* *l.* 02 09 00 | 8 | 9 | 00 |
| | 10 ditto | | | |
| 4 | *David* Stout Debtor to ditto | | | |
| | 5 Frail Figgs at ——— *l.* 02 10 00 | 12 | 10 | 00 |
| | Goods Sold | 66 | 3 | 00 |

Day-

| 1729 | Day-Book Page 3. | l. | s. | d. |
|---|---|---|---|---|
| | *September* 20 | | | |
| | *Edward Smith* Debtor to Goods | | | |
| 4 | 23 yds Cloth at 21s. 6 *d.l.*24 *s* 14 6 | | | |
| | 10 ditto at 15 *s.* 0 — *l.* 07 10 00 | 32 | 4 | 06 |
| | 22 ditto | | | |
| | *Robert Johnſon* Debtor to ditto | | | |
| | 12 lb. Tobacco at 2 *s.* — *l.* 01 04 00 | | | |
| | 6 lb. Ginger at 1 *s.* —— *l.* 00 06 00 | | | |
| | 17 lb. Raiſins at 7 *d.* — *l.* 00 09 11 | | | |
| | 10 lb. Nut. at 2 *s.* 6 *d.* -- *l.* 01 05 00 | 3 | 4 | 11 |
| | 24 ditto | | | |
| | *Ralph Wilſon* Debtor to ditto | | | |
| 3 | 12 yds Cloth at 15 *s.* — *l.* 09 00 00 | | | |
| | 4 ditto at 10. s. —— *l.* 02 00 00 | 11 | 00 | 00 |
| | 25 ditto | | | |
| | Mark Noble Debtor to ditto | | | |
| 3 | 20 lb. Tea at 5 *s.* —— *l.* 05 00 00 | | | |
| | 10 lb. Coffee at 4 *s.* —— *l.* 02 00 00 | | | |
| | ½ C. Sugar at 6 *d.* —— *l.* 01 08 00 | | | |
| | ½ C. Currants at 6 *d.* — *l.* 01 08 00 | 9 | 16 | 00 |
| | Goods Sold | 56 | 5 | 05 |

Day-

| 1729 | Day-Book Page 4. | *l.* | *s.* | *d.* |
|---|---|---|---|---|
| | *September* 26th | | | |
| | *John Rich* Debtor to Goods | | | |
| 3 | 6 yds. Serge at 1 s 6 *d. l.* 00 09 00 | | | |
| | 8 ditto at 2 *s.* —— *l.* 00 16 00 | | | |
| | 6 ditto Shalloon 1*s.* 6 *d.l.* 00 09 00 | 01 | 14 | 00 |
| | 27 ditto | | | |
| | *Edward Smith*, Debtor to ditto | | | |
| | 10 yds Linn 1 *s.* 4 *d.*—*l.* 00 13 0 | | | |
| 4 | 6 ditto Holland 4*s* 6*d*—*l.* 01 07 0 | 02 | 00 | 00 |
| | 30 ditto | | | |
| | Rec'd ready Money for Goods Sold | 50 | 00 | |
| | Goods Sold | 41 | 53 | 4 |

## The *Leidger* ALPHABET,

| | | | |
|---|---|---|---|
| B | | M | |
| Ballance | 4 | Merchandize | 1 |
| E | | N | |
| Expence and Abm. | 2. | Noble Mark | 3. |
| G | | R | |
| Goodwin Richard | 2 | Rich John | 3 |
| H | | S | |
| Hunt Thomas | 2. | Simpſon John | 2 |
| I | | Smith Edward | 4 |
| Johnſon Robert | 4 | Stout David | 4. |
| Jackſon Samuel | 4 | Swift Henry | 4. |
| Johnſon Richard | 2 | T | |
| | | Tims Richard | 3 |
| | | W | |
| | | Willſon Ralph | 3 |

## *Leidger* Folio 1

| | | | Fo. | l. | s. | d. |
|---|---|---|---|---|---|---|
| | | Stock —— Debtor | | | | |
| *Aug* | 1 | To ſundry Perſons | | 70 | 10 | 00 |
| | | To Ballance Neat Stock | | 580 | | 00 |
| | | | | 650 | 10 | 00 |
| | | Good*s* —— Debtor | | | | |
| 1729 | | To *Stock per* Inventory | | 300 | 00 | 00 |
| *Aug* | 1ſt | Profit and Loſs carried to | | 120 | 10 | 00 |
| *Sept* | 30 | | 5 | | | |
| | | | | 420 | 10 | 00 |
| | | Caſh—Debtor | | | | |
| 1725 | | To Caſh *per* Inventory | | | | |
| *Aug.* | 1 | To *Sund. per* Book Folio 1. | | 186 | 00 | 00 |
| | 31 | To ditto ——— ——— 1. — | | 66 | 04 | 00 |
| S*ept.* | 30 | | | 166 | 09 | 00 |
| | | | | 400 | 13 | 00 |

| 1729 | | *Leidger* Folio 1. | F. | l. | s. | d |
|---|---|---|---|---|---|---|
| | | Contra Creditor | | | | |
| *Aug* | 4 | By Sundry *per* Inventory | | 370 | 00 | 00 |
| | | By Profit & Loſs in 2 mon. | | 80 | 10 | 00 |
| 1729 | | Goods Creditor | | | | |
| *Aug.* | 10 | By Sundrys ſold D. B. 1ſt | | 30 | 17 | 08 |
| | 31 | By ditto Page 2 | | 66 | 3 | 00 |
| *Sept.* | 25 | By ditto Page 3 | | 56 | 5 | 05 |
| | 30 | By ditto Page 4 | | 53 | 14 | 04 |
| | | | | 207 | 00 | 05 |
| | | By Stock remaining | | 213 | 9 | 07 |
| | | | | 420 | 10 | 00 |
| 1729 | | Contra Creditor | | | | |
| *Aug.* | 31 | By Sundrysas *per* Book | | 35 | 00 | 00 |
| *Sept.* | 30 | By ditto Page 1. | | 60 | 10 | 00 |
| | | By Ballance in Caſh | | 95 | 10 | 00 |
| | | | | 301 | 3 | 00 |
| | | | | 406 | 13 | 00 |

| 1729 | | *Leidger* Folio 2. | | l. | s. | d. |
|---|---|---|---|---|---|---|
| Sept. | 30 | Expences —— Debtor<br>To Paid since August 1st. | 1 | 10 | 10 | 00 |
| 1729<br>Aug. | 1 | *Richard Johnson* Debtor.<br>To Stock now due to me | 1 | 50 | 00 | 00 |
| 1729<br>Aug. | 1 | *John Simpson* Debtor<br>To Stock now due | 1 | 40 | 00 | 00 |
| 1729 | | *Thomas Hunt,* Debtor. | | | | |
| Aug. | 10 | To Paid him | 1 | 15 | 00 | 00 |
| Sept. | 15 | To ditto | 1 | 10 | 00 | 00 |
| | | Ballance due to him | | 25 | 00 | 00 |
| 1729 | | *Richard Goodwin,* Debtor. | 1 | 20 | 00 | 00 |
| Aug. | 31 | To Cash paid him | 2 | 10 | 00 | 00 |
| | | To ditto paid him | | | | |
| | | | | 30 | 00 | 00 |
| | | Ballance due to him | | 10 | 00 | 00 |
| | | | | 40 | 00 | 00 |

| 1729 | | Leidger Folio 2. | f. | l. | s. | d. |
|---|---|---|---|---|---|---|
| | | Contra——Creditor | | | | |
| Sept | 30 | By Profit & Loſs carry'd to | 5 | 4 | 10 | 00 |
| 1729 | | Contra——Creditor | | | | |
| | | By Receipt paid me | 1 | 0 | 00 | 00 |
| | | By ballance now oweing me | | 30 | 0 | 00 |
| 1729 | | Contra——Creditor | | | | |
| | | By Caſh Receiv'd | 1 | 20 | 00 | 00 |
| | | By ballance due | | 20 | 00 | 00 |
| | | Contra——Creditor | | | | |
| 1729 | | | | | | |
| Aug | 1 | By Caſh oweing him | | 30 | 00 | 00 |
| 1729 | | Contra——Creditor | | | | |
| Aug | 1 | By Money oweing him | | 40 | 00 | 00 |

## Leidger Folio 4.

| | | | Fo. | l. | s. | d. |
|---|---|---|---|---|---|---|
| | | **Henry Swift Debtor.** | | | | |
| 1729 Aug | 20 | To a Parcel | 2 | 14 | 14 | 0 |
| | | **Samuel Jackson Debtor** | | | | |
| 1729 Sep. | 6 | To a Parcel | 2 | 8 | 9 | 0 |
| | | **David Stout Debtor** | | | | |
| 1729 Sept. | 1 | To Figgs | 2 | 12 | 10 | 0 |
| | | **Edward Smith Debtor** | | | | |
| 1729 Sept. | 20 | To a Parcel | 3 | 32 | 4 | 6 |
| | 27 | To ditto | 4 | 2 | | 4 |
| | | | | 34 | 04 | 10 |
| | | **Robert Johnson Debtor** | | | | |
| 1729 Sept | 22 | To a Parcel | 3 | 4 | 11 | |

## *Leidger* Folio 4.

| | | | F | l. | s. | d. |
|---|---|---|---|---|---|---|
| | | Contra — ——— Creditor | 7 | | | |
| *Aug* | 25 | By Caſh receiv'd in full | | 14 | 14 | 00 |
| | 10 | | 2 | | | |
| 1729 | | Contra ——— Creditor | | | | |
| *Sept* | | By Caſh receiv'd in full | | 8 | 9 | 00 |
| | 18 | | | | | |
| 1729 | | Contra ——— ——— Creditor | 1 | 10 | 00 | 00 |
| Sept. | | By Caſh on Account | | 02 | 10 | 00 |
| | | Due to Ballance | | | | |
| | | | | 12 | 10 | 00 |
| 1729 | | Contra ——— ——— Creditor | 1 | 30 | 00 | 00 |
| Sept | 10 | By Caſh on Account | 1 | 1 | 00 | 00 |
| | | By ditto | | | | |
| | | | | 31 | 00 | 00 |
| | | Due to Ballance. | | 3 | 4 | 10 |
| | | | | 34 | 4 | 10 |
| 1719 | | Contra ——— Creditor. | | | | |
| *Sept.* | 26 | By Caſh on Account | 1 | 3 | 00 | 00 |
| | | Due to Ballance | | | 4 | 11 |
| | | | | 3 | 4 | 11 |

## *Leidger* Folio 5.

| | | F | l. | s. | d. |
|---|---|---|---|---|---|
| | Profit and Loſs Debtor | | | | |
| Sept. 30 | To Expences brought here | 1 | 40 | 10 | 00 |
| | To Stock gain'd ſince *Aug* 1*ſt* | | 80 | 00 | 00 |
| | | | 120 | 10 | 00 |
| 1729 | Ballance——Debtor | | | | |
| Sept. 30 | To Goods remaining | 1 | 213 | 9 | 7 |
| | To Caſh in hand | | 312 | 3 | 00 |
| | *Ralph Wilſon* owes | 3 | 3 | 12 | 00 |
| | *Mark* Noble ditto | 3 | 1 | 14 | 04 |
| | *John Rich* ditto | 3 | 8 | 4 | 00 |
| | *Richard Tims* ditto | 3 | 0 | 7 | 04 |
| | *David* Stout ditto | 4 | 2 | 10 | 00 |
| | *Edward* Smith ditto | 4 | 3 | 4 | 10 |
| | *Robert Johnſon* ditto | 4 | 0 | 4 | 11 |
| | *John Simpſon* ditto | 2 | 30 | 00 | 00 |
| | *Richard Johnſon* ditto | 2 | 20 | 00 | 00 |
| | | | 565 | 10 | 00 |

## *Leidger* Folio 5.

|  |  |  | F | l. | s. | d. |
|---|---|---|---|---|---|---|
|  |  | Contra —— Creditor |  |  |  |  |
| Sept. | 30 | By Goods to Ballance |  | 120 | 10 | 00 |
| 1729 |  | Ballance —— Creditor |  |  |  |  |
| Sept. | 30 | By oweing to Tho. Hunt |  |  |  |  |
|  |  | By ditto to Richard Goodwin | 2 | 5 | 00 | 00 |
|  |  | By Stock Neat | 2 | 10 | 00 | 00 |
|  |  |  |  | 15 | 00 | 00 |
|  |  |  |  | 580 | 10 | 00 |
|  |  |  |  | 56 | 10 | 00 |

# The EXPLANATION

THE Figures in the Caſh-Book coming before the Money Lines, ſhew the Folio's of the Leidger, where the Account is Poſted. Likewiſe thoſe ſtanding before the Journal Entries do the ſame: And thoſe on the Leidger ſhew the Folio's of the Caſh-Book and Journal, from whence Poſted.

18 JU 70

To ballance at the Years End, ſo as to know your Ciroumſtances *&c.* Even all your Debtors and all your Creditors in order as they ſtand and bear the Net reſt of every ſeveral Debtor and Creditor to Ballance. Then Even your Stock and bear the Net reſt to ballance Creditor.

Then caſt up the Debtor and Creditor Sides, of your ballance and if they come both out alike then are your Accompts well kept, otherwiſe, you muſt prick over your Books again, to ſee that you have enter'd every Debtor and Creditor right in your Leidger. This done you may form a New Inventory and open new Books.

*Note*, That the Money, Wares, or Goods, remaining in your Hands, and the Debts oweing to you, muſt ever ballance with the Net Stock, and Debts oweing by you.

## *FINIS.*

Stephen Stapley

This Book God give him
Grace there in to Look
But not to Look but
Understand for Learing is
when house & Land is
Better then house & Land is
Gon & Spent then Larning is
Most Excellent · August ye 15:

Georg Spearing
His Book 1755

Mr Chilyns Proctor
In Doctors Commons
April ye 11 1735